Sun SPARC® Enterprise T5120 and T5220 Servers Service Manual

For 1U and 2U Systems

Sun Microsystems, Inc.
www.sun.com

Part No. 820-2181-10
August 2007, Revision 05

Submit comments about this document at: `http://www.sun.com/hwdocs/feedback`

Copyright 2007 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, U.S.A. All rights reserved.

FUJITSU LIMITED provided technical input and review on portions of this material.

Sun Microsystems, Inc. and Fujitsu Limited each own or control intellectual property rights relating to products and technology described in this document, and such products, technology and this document are protected by copyright laws, patents and other intellectual property laws and international treaties. The intellectual property rights of Sun Microsystems, Inc. and Fujitsu Limited in such products, technology and this document include, without limitation, one or more of the United States patents listed at http://www.sun.com/patents and one or more additional patents or patent applications in the United States or other countries.

This document and the product and technology to which it pertains are distributed under licenses restricting their use, copying, distribution, and decompilation. No part of such product or technology, or of this document, may be reproduced in any form by any means without prior written authorization of Fujitsu Limited and Sun Microsystems, Inc., and their applicable licensors, if any. The furnishing of this document to you does not give you any rights or licenses, express or implied, with respect to the product or technology to which it pertains, and this document does not contain or represent any commitment of any kind on the part of Fujitsu Limited or Sun Microsystems, Inc., or any affiliate of either of them.

This document and the product and technology described in this document may incorporate third-party intellectual property copyrighted by and/or licensed from suppliers to Fujitsu Limited and/or Sun Microsystems, Inc., including software and font technology.

Per the terms of the GPL or LGPL, a copy of the source code governed by the GPL or LGPL, as applicable, is available upon request by the End User. Please contact Fujitsu Limited or Sun Microsystems, Inc.

This distribution may include materials developed by third parties.

Parts of the product may be derived from Berkeley BSD systems, licensed from the University of California. UNIX is a registered trademark in the U.S. and in other countries, exclusively licensed through X/Open Company, Ltd.

Sun, Sun Microsystems, the Sun logo, Java, Netra, Solaris, Sun StorEdge, docs.sun.com, OpenBoot, SunVTS, Sun Fire, SunSolve, CoolThreads, J2EE, and Sun are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries.

Fujitsu and the Fujitsu logo are registered trademarks of Fujitsu Limited.

All SPARC trademarks are used under license and are registered trademarks of SPARC International, Inc. in the U.S. and other countries. Products bearing SPARC trademarks are based upon architecture developed by Sun Microsystems, Inc.

SPARC64 is a trademark of SPARC International, Inc., used under license by Fujitsu Microelectronics, Inc. and Fujitsu Limited.

The OPEN LOOK and Sun™ Graphical User Interface was developed by Sun Microsystems, Inc. for its users and licensees. Sun acknowledges the pioneering efforts of Xerox in researching and developing the concept of visual or graphical user interfaces for the computer industry. Sun holds a non-exclusive license from Xerox to the Xerox Graphical User Interface, which license also covers Sun's licensees who implement OPEN LOOK GUIs and otherwise comply with Sun's written license agreements.

United States Government Rights - Commercial use. U.S. Government users are subject to the standard government user license agreements of Sun Microsystems, Inc. and Fujitsu Limited and the applicable provisions of the FAR and its supplements.

Disclaimer: The only warranties granted by Fujitsu Limited, Sun Microsystems, Inc. or any affiliate of either of them in connection with this document or any product or technology described herein are those expressly set forth in the license agreement pursuant to which the product or technology is provided. EXCEPT AS EXPRESSLY SET FORTH IN SUCH AGREEMENT, FUJITSU LIMITED, SUN MICROSYSTEMS, INC. AND THEIR AFFILIATES MAKE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND (EXPRESS OR IMPLIED) REGARDING SUCH PRODUCT OR TECHNOLOGY OR THIS DOCUMENT, WHICH ARE ALL PROVIDED AS IS, AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID. Unless otherwise expressly set forth in such agreement, to the extent allowed by applicable law, in no event shall Fujitsu Limited, Sun Microsystems, Inc. or any of their affiliates have any liability to any third party under any legal theory for any loss of revenues or profits, loss of use or data, or business interruptions, or for any indirect, special, incidental or consequential damages, even if advised of the possibility of such damages.

DOCUMENTATION IS PROVIDED "AS IS" AND ALL EXPRESS OR IMPLIED CONDITIONS, REPRESENTATIONS AND WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT, ARE DISCLAIMED, EXCEPT TO THE EXTENT THAT SUCH DISCLAIMERS ARE HELD TO BE LEGALLY INVALID.

Copyright 2007 Sun Microsystems, Inc., 4150 Network Circle, Santa Clara, California 95054, Etats-Unis. Tous droits réservés.

Entrée et revue tecnical fournies par FUJITSU LIMITED sur des parties de ce matériel.

Sun Microsystems, Inc. et Fujitsu Limited détiennent et contrôlent toutes deux des droits de propriété intellectuelle relatifs aux produits et technologies décrits dans ce document. De même, ces produits, technologies et ce document sont protégés par des lois sur le copyright, des brevets, d'autres lois sur la propriété intellectuelle et des traités internationaux. Les droits de propriété intellectuelle de Sun Microsystems, Inc. et Fujitsu Limited concernant ces produits, ces technologies et ce document comprennent, sans que cette liste soit exhaustive, un ou plusieurs des brevets déposés aux États-Unis et indiqués à l'adresse http://www.sun.com/patents de même qu'un ou plusieurs brevets ou applications brevetées supplémentaires aux États-Unis et dans d'autres pays.

Ce document, le produit et les technologies afférents sont exclusivement distribués avec des licences qui en restreignent l'utilisation, la copie, la distribution et la décompilation. Aucune partie de ce produit, de ces technologies ou de ce document ne peut être reproduite sous quelque forme que ce soit, par quelque moyen que ce soit, sans l'autorisation écrite préalable de Fujitsu Limited et de Sun Microsystems, Inc., et de leurs éventuels bailleurs de licence. Ce document, bien qu'il vous ait été fourni, ne vous confère aucun droit et aucune licence, expresses ou tacites, concernant le produit ou la technologie auxquels il se rapporte. Par ailleurs, il ne contient ni ne représente aucun engagement, de quelque type que ce soit, de la part de Fujitsu Limited ou de Sun Microsystems, Inc., ou des sociétés affiliées.

Ce document, et le produit et les technologies qu'il décrit, peuvent inclure des droits de propriété intellectuelle de parties tierces protégés par copyright et/ou cédés sous licence par des fournisseurs à Fujitsu Limited et/ou Sun Microsystems, Inc., y compris des logiciels et des technologies relatives aux polices de caractères.

Par limites du GPL ou du LGPL, une copie du code source régi par le GPL ou LGPL, comme applicable, est sur demande vers la fin utilsateur disponible; veuillez contacter Fujitsu Limted ou Sun Microsystems, Inc.

Cette distribution peut comprendre des composants développés par des tierces parties.

Des parties de ce produit pourront être dérivées des systèmes Berkeley BSD licenciés par l'Université de Californie. UNIX est une marque déposée aux Etats-Unis et dans d'autres pays et licenciée exclusivement par X/Open Company, Ltd.

Sun, Sun Microsystems, le logo Sun, Java, Netra, Solaris, Sun StorEdge, docs.sun.com, OpenBoot, SunVTS, Sun Fire, SunSolve, CoolThreads, J2EE, et Sun sont des marques de fabrique ou des marques déposées de Sun Microsystems, Inc. aux Etats-Unis et dans d'autres pays.

Fujitsu et le logo Fujitsu sont des marques déposées de Fujitsu Limited.

Toutes les marques SPARC sont utilisées sous licence et sont des marques de fabrique ou des marques déposées de SPARC International, Inc. aux Etats-Unis et dans d'autres pays. Les produits portant les marques SPARC sont basés sur une architecture développée par Sun Microsystems, Inc.

SPARC64 est une marques déposée de SPARC International, Inc., utilisée sous le permis par Fujitsu Microelectronics, Inc. et Fujitsu Limited.

L'interface d'utilisation graphique OPEN LOOK et Sun™ a été développée par Sun Microsystems, Inc. pour ses utilisateurs et licenciés. Sun reconnaît les efforts de pionniers de Xerox pour la recherche et le développement du concept des interfaces d'utilisation visuelle ou graphique pour l'industrie de l'informatique. Sun détient une license non exclusive de Xerox sur l'interface d'utilisation graphique Xerox, cette licence couvrant également les licenciés de Sun qui mettent en place l'interface d'utilisation graphique OPEN LOOK et qui, en outre, se conforment aux licences écrites de Sun.

Droits du gouvernement américain - logiciel commercial. Les utilisateurs du gouvernement américain sont soumis aux contrats de licence standard de Sun Microsystems, Inc. et de Fujitsu Limited ainsi qu'aux clauses applicables stipulées dans le FAR et ses suppléments.

Avis de non-responsabilité: les seules garanties octroyées par Fujitsu Limited, Sun Microsystems, Inc. ou toute société affiliée de l'une ou l'autre entité en rapport avec ce document ou tout produit ou toute technologie décrit(e) dans les présentes correspondent aux garanties expressément stipulées dans le contrat de licence régissant le produit ou la technologie fourni(e). SAUF MENTION CONTRAIRE EXPRESSÉMENT STIPULÉE DANS CE CONTRAT, FUJITSU LIMITED, SUN MICROSYSTEMS, INC. ET LES SOCIÉTÉS AFFILIÉES REJETTENT TOUTE REPRÉSENTATION OU TOUTE GARANTIE, QUELLE QU'EN SOIT LA NATURE (EXPRESSE OU IMPLICITE) CONCERNANT CE PRODUIT, CETTE TECHNOLOGIE OU CE DOCUMENT, LESQUELS SONT FOURNIS EN L'ÉTAT. EN OUTRE, TOUTES LES CONDITIONS, REPRÉSENTATIONS ET GARANTIES EXPRESSES OU TACITES, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE À LA QUALITÉ MARCHANDE, À L'APTITUDE À UNE UTILISATION PARTICULIÈRE OU À L'ABSENCE DE CONTREFAÇON, SONT EXCLUES, DANS LA MESURE AUTORISÉE PAR LA LOI APPLICABLE. Sauf mention contraire expressément stipulée dans ce contrat, dans la mesure autorisée par la loi applicable, en aucun cas Fujitsu Limited, Sun Microsystems, Inc. ou l'une de leurs filiales ne sauraient être tenues responsables envers une quelconque partie tierce, sous quelque théorie juridique que ce soit, de tout manque à gagner ou de perte de profit, de problèmes d'utilisation ou de perte de données, ou d'interruptions d'activités, ou de tout dommage indirect, spécial, secondaire ou consécutif, même si ces entités ont été préalablement informées d'une telle éventualité.

LA DOCUMENTATION EST FOURNIE "EN L'ETAT" ET TOUTES AUTRES CONDITIONS, DECLARATIONS ET GARANTIES EXPRESSES OU TACITES SONT FORMELLEMENT EXCLUES, DANS LA MESURE AUTORISEE PAR LA LOI APPLICABLE, Y COMPRIS NOTAMMENT TOUTE GARANTIE IMPLICITE RELATIVE A LA QUALITE MARCHANDE, A L'APTITUDE A UNE UTILISATION PARTICULIERE OU A L'ABSENCE DE CONTREFACON.

Contents

Preface xiii

1. Sun SPARC Enterprise T5120 and T5220 Servers Overview 1–1

1.1 Server Features 1–2

1.1.1 Chip Multitheaded Multicore Processor and Memory Technology 1–3

1.1.2 Performance Enhancements 1–3

1.1.3 Remote Manageability With ILOM 1–5

1.1.4 System Reliability, Availability, and Serviceability 1–6

1.1.5 Predictive Self-Healing 1–8

1.2 Chassis Overview 1–8

1.2.1 Infrastructure Boards 1–8

1.2.2 System Cables 1–9

1.3 About the Front Panel 1–10

1.3.1 Sun SPARC Enterprise T5120 Server Front Panel 1–10

1.3.2 Sun SPARC Enterprise T5220 Server Front Panel 1–12

1.3.3 Front Panel LEDs 1–13

1.4 About the Rear Panel 1–14

1.4.1 Rear Component Access — Sun SPARC Enterprise T5120 Server 1–14

1.4.2 Rear Component Access — Sun SPARC Enterprise T5220 Server 1–16

1.4.3 Rear Panel LEDs 1–17

1.4.4 Ethernet Port LEDs 1–18

2. Server Diagnostics 2–1

2.1 Overview of Server Diagnostics 2–1

2.1.1 Memory Fault Handling 2–6

2.2 Using LEDs to Identify the State of Devices 2–7

2.3 Using the Service Processor Firmware for Diagnosis and Repair Verification 2–9

2.3.1 About the ALOM CMT Shell 2–11

2.3.2 Creating an ALOM CMT Shell 2–12

2.3.3 Running ALOM CMT Service-Related Commands 2–14

2.3.4 Running the `showfaults` Command 2–17

2.3.5 Running the `clearfault` Command 2–18

2.3.6 Running the `showenvironment` Command 2–18

2.3.7 Running the `showfru` Command 2–20

2.4 Running POST 2–22

2.4.1 Controlling How POST Runs 2–22

2.4.2 Changing POST Parameters 2–25

2.4.3 Reasons to Run POST 2–26

2.4.4 Running POST in Maximum Mode 2–26

2.4.5 Clearing POST Detected Faults 2–30

2.5 Using the Solaris Predictive Self-Healing Feature 2–32

2.5.1 Identifying PSH Detected Faults 2–33

2.5.2 Clearing PSH Detected Faults 2–35

2.6 Collecting Information From Solaris OS Files and Commands 2–37

2.6.1 Checking the Message Buffer 2–37

2.6.2 Viewing System Message Log Files 2–37

2.7 Managing Components With Automatic System Recovery Commands 2–38

2.7.1 Displaying System Components 2–39

2.7.2 Disabling Components 2–40

2.7.3 Enabling Disabled Components 2–41

2.8 Exercising the System With SunVTS 2–41

2.8.1 Checking Whether SunVTS Software Is Installed 2–41

2.8.2 Exercising the System Using SunVTS Software 2–42

2.8.3 Exercising the System With SunVTS Software 2–43

3. Preparing to Service the System 3–1

3.1 Safety Information 3–1

3.1.1 Safety Symbols 3–2

3.1.2 Electrostatic Discharge Safety Measures 3–2

3.2 Required Tools 3–3

3.3 Obtaining the Chassis Serial Number 3–4

3.4 Powering Off the Server 3–4

3.4.1 Powering Off the Server – Service Processor Command Line 3–4

3.4.2 Powering Off the Server – Graceful Shutdown 3–5

3.4.3 Powering Off the Server – Emergency Shutdown 3–5

3.5 Disconnecting Power Cords from the Server 3–6

3.6 Extending the Server to the Maintenance Position 3–6

3.7 Removing a Server From the Rack 3–8

3.8 Performing Electrostatic Discharge – Antistatic Prevention Measures 3–11

3.9 Removing the Top Cover 3–12

4. Replacing Hot-Pluggable and Hot-Swappable Components 4–1

4.1 Devices That are Hot-Pluggable or Hot-Swappable 4–1

4.2 About the Hard Drives 4–2

4.2.1 Hard Drive LEDs 4–3

4.3 About the Fan Modules 4–4

4.3.1 About Sun SPARC Enterprise T5120 Server Fans 4–4

4.3.2 About Sun SPARC Enterprise T5220 Server Fans 4–4

4.3.3 Fan Module LEDs 4–4

4.4 About the Power Supplies 4–5

4.4.1 Power Supply LEDs 4–6

4.5 Hot-Plugging a Hard Drive 4–7

4.5.1 Removing a Hard Drive 4–7

4.5.2 Installing a Hard Drive 4–10

4.6 Hot-Swapping a Fan Module 4–13

4.6.1 Removing a Fan Module 4–13

4.6.2 Installing a Fan Module 4–14

4.7 Hot-Swapping a Power Supply 4–16

4.7.1 Removing a Power Supply 4–16

4.7.2 Installing a Power Supply 4–19

4.8 Reference for Hard Drive Configuration 4–21

4.8.1 Sun SPARC Enterprise T5120 Server Hard Drive Locations 4–21

4.8.2 Sun SPARC Enterprise T5220 Server Hard Drive Locations 4–22

4.9 Reference for Fan Module Configuration 4–23

4.9.1 Sun SPARC Enterprise T5120 Fan Module Locations 4–23

4.9.2 Sun SPARC Enterprise T5220 Fan Module Locations 4–23

4.10 Reference For Power Supply Configuration 4–24

5. Servicing Motherboard Components 5–1

5.1 Servicing FB-DIMMs 5–2

5.1.1 Locating a Faulty FB-DIMM 5–2

5.1.2 Removing FB-DIMMs 5–3

5.1.3 Installing FB-DIMMs 5–5

5.1.4 Verifying Successful Replacement of a Faulty FB-DIMM 5–6

5.1.5 Installing Additional FB-DIMMs 5–10

5.2 Servicing the Air Baffle 5–11

5.2.1 Removing the Air Baffle 5–12

5.2.2 Installing the Air Baffle 5–12

5.3 Servicing PCIe/XAUI Risers 5–13

5.3.1 Removing a PCIe/XAUI Riser 5–13

5.3.2 Installing a PCIe/XAUI Riser 5–15

5.4 Servicing PCIe/XAUI Cards 5–17

5.4.1 Removing PCIe and XAUI Cards 5–18

5.4.2 Installing PCIe or XAUI Cards 5–19

5.5 Servicing the Battery 5–22

5.5.1 Removing the Battery 5–23

5.5.2 Installing the Battery 5–23

5.6 Servicing the SCC Module 5–24

5.6.1 Removing the SCC Module 5–24

5.6.2 Installing the SCC Module 5–24

5.7 Servicing the Motherboard Assembly 5–26

5.7.1 Removing the Motherboard Assembly 5–26

5.7.2 Installing the Motherboard Assembly 5–28

5.8 Reference for FB-DIMM Configuration 5–30

5.9 Reference for PCIe and XAUI Card Configuration 5–35

5.9.1 Sun SPARC Enterprise T5120 Server PCIe/XAUI Card Configuration Guidelines 5–35

5.9.2 Sun SPARC Enterprise T5220 Server PCIe/XAUI Card Guidelines 5–36

6. Servicing Infrastructure Boards and Components 6–1

6.1 Servicing the DVD/USB Module 6–2

6.1.1 Removing the DVD/USB Module 6–2

6.1.2 Installing the DVD/USB Module 6–3

6.2 Servicing the Fan Power Boards 6–4

6.2.1 Removing a Fan Power Board 6–5

6.2.2 Installing a Fan Power Board 6–6

6.3 Servicing the Hard Drive Cage 6–7

6.3.1 Removing the Hard Drive Cage 6–7

6.3.2 Installing the Hard Drive Cage 6–10

6.4 Servicing the Hard Drive Backplane 6–11

6.4.1 Removing the Hard Drive Backplane 6–12

6.4.2 Installing the Hard Drive Backplane 6–13

6.5 Servicing the Front Control Panel Light Pipe Assemblies 6–15

6.5.1 Removing the Front Control Panel Light Pipe Assemblies 6–15

6.5.2 Installing the Front Control Panel Light Pipe Assembly 6–16

6.6 Servicing the Power Distribution Board 6–16

6.6.1 Removing the Power Distribution Board 6–16

6.6.2 Installing the Power Distribution Board 6–19

6.7 Servicing the Power Supply Backplane for the Sun SPARC Enterprise T5220 Server 6–23

6.7.1 Removing the Power Supply Backplane 6–24

6.7.2 Installing the Power Supply Backplane 6–25

6.8 Servicing the Paddle Card 6–26

6.8.1 Removing the Paddle Card 6–27

6.8.2 Installing the Paddle Card 6–28

7. Returning the Server to Operation 7–1

7.1 Installing the Top Cover 7–2

7.2 Reinstalling the Server in the Rack 7–3

7.3 Returning the Server to the Normal Rack Position 7–4

7.4 Connecting Power Cords to the Server 7–5

7.5 Powering On the Server 7–5

A. Field-Replacable Units A–1

A.1 Sun SPARC Enterprise T5120 Server A–2

A.2 Sun SPARC Enterprise T5220 Server A–10

B. Connector Pinouts B–1

B.1 Reference for the Serial Management Port Connector B–2

B.2 Reference for the Network Management Port Connector B–3

B.3 Reference for the Serial Port Connector B–4

B.4 Reference for the USB Connectors B–5

B.5 Reference for the Gigabit Ethernet Connectors B–6

Index Index–1

Preface

The *Sun SPARC Enterprise T5120 and T5220 Servers Service Manual* provides detailed procedures that describe the removal and replacement of replaceable parts in the these servers. This manual also includes information about the use and maintenance of the servers. This document is written for technicians, system administrators, authorized service providers (ASPs), and users who have advanced experience troubleshooting and replacing hardware.

Before You Read This Document

To fully use the information in this document, you must have thorough knowledge of the topics discussed in the *Sun SPARC Enterprise T5120 and T5220 Servers Product Notes.*

How This Document Is Organized

- Chapter 1 provides an overview of the system, including front and back panel features.
- Chapter 2 describes approaches for isolating and resolving system faults.
- Chapter 3 describes the steps necessary to prepare the system for service.
- Chapter 4 describes the service procedures which can be done while the system is running (hot serviceable procedures).
- Chapter 5 describes the service procedures for the motherboard and its associated components, including installing and upgrading memory modules (FB-DIMMs).

- Chapter 6 describes the service procedures for all other components.
- Chapter 7 describes how to bring the server back to operation after performing service procedures.
- Appendix A contains illustrations showing system components.
- Appendix B contains pinout tables for all external connectors.

Using UNIX Commands

This document might not contain information about basic UNIX® commands and procedures such as shutting down the system, booting the system, and configuring devices. Refer to the following for this information:

- Software documentation that you received with your system
- Solaris™ Operating System documentation, which is at:

  `http://docs.sun.com`

Shell Prompts

Shell	Prompt
C shell	*machine-name*%
C shell superuser	*machine-name*#
Bourne shell and Korn shell	$
Bourne shell and Korn shell superuser	#

Typographic Conventions

Typeface*	Meaning	Examples
`AaBbCc123`	The names of commands, files, and directories; on-screen computer output	Edit your `.login` file. Use `ls -a` to list all files. `% You have mail.`
`AaBbCc123`	What you type, when contrasted with on-screen computer output	`% su` `Password:`
AaBbCc123	Book titles, new words or terms, words to be emphasized. Replace command-line variables with real names or values.	Read Chapter 6 in the *User's Guide*. These are called *class* options. You *must* be superuser to do this. To delete a file, type `rm` *filename*.

* The settings on your browser might differ from these settings.

Related Documentation

The documents listed as online are available at:

`http://www.sun.com/products-n-solutions/hardware/docs/`

Application	Title	Part Number	Format	Location
Late-breaking information	*Sun SPARC Enterprise T5120 and T5220 Servers Product Notes*	820-2176	PDF	Online
Site planning	*Sun SPARC Enterprise T5120 and T5220 Servers Site Planning Guide*	820-2177	PDF	Online
Safety and regulatory compliance	*Sun SPARC Enterprise T5120 and 5220 Servers Compliance and Safety Manual*	820-2182	PDF	Online
Installation	*Sun SPARC Enterprise T5120 and T5220 Servers Installation Guide*	*820-2178*	Printed PDF	Shipping kit Online
System administration	*Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide*	*820-2179*	PDF HTML	Online
Service processor	*Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*		PDF	Online

Documentation, Support, and Training

Sun Function	URL
Documentation	`http://www.sun.com/documentation/`
Support	`http://www.sun.com/support/`
Training	`http://www.sun.com/training/`

Third-Party Web Sites

Sun is not responsible for the availability of third-party web sites mentioned in this document. Sun does not endorse and is not responsible or liable for any content, advertising, products, or other materials that are available on or through such sites or resources. Sun will not be responsible or liable for any actual or alleged damage or loss caused by or in connection with the use of or reliance on any such content, goods, or services that are available on or through such sites or resources.

Sun Welcomes Your Comments

Sun is interested in improving its documentation and welcomes your comments and suggestions. You can submit your comments by going to:

`http://www.sun.com/hwdocs/feedback`

Please include the title and part number of your document with your feedback:

Sun SPARC Enterprise T5120 and T5220 Servers Service Manual, part number 820-2181-10.

CHAPTER 1

Sun SPARC Enterprise T5120 and T5220 Servers Overview

This chapter provides an overview of the features of the Sun SPARC® Enterprise T5120 and Sun SPARC Enterprise T5220 servers.

The following topics are covered:

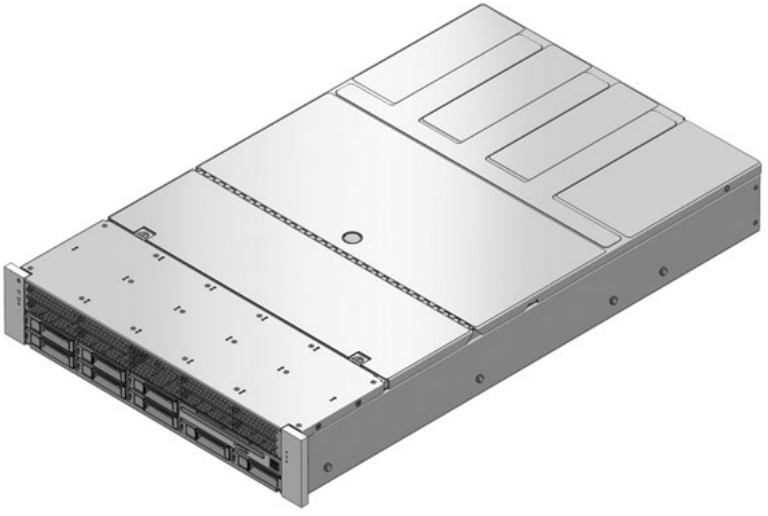
- Section 1.1, “Server Features” on page 1-2
- Section 1.2, “Chassis Overview” on page 1-8
- Section 1.3, “About the Front Panel” on page 1-10
- Section 1.4, “About the Rear Panel” on page 1-14

1.1 Server Features

The Sun SPARC Enterprise T5120 and T5220 servers are high-performance entry-level servers that are highly scalable and extremely reliable.

FIGURE 1-1 Sun SPARC Enterprise T5120 Server

FIGURE 1-2 Sun SPARC Enterprise T5220 Server



1.1.1 Chip Multitheaded Multicore Processor and Memory Technology

The UltraSPARC® T2 multicore processor is the basis of the server. The UltraSPARC T2 processor is based on chip multithreading (CMT) technology that is optimized for highly threaded transactional processing. The UltraSPARC T2 processor improves throughput while using less power and dissipating less heat than conventional processor designs.

Depending on the model purchased, the processor has four, six, or eight UltraSPARC cores, each with its own floating-point unit (FPU). Each core equates to a 64-bit execution pipeline capable of running eight threads. The result is that the 8-core processor handles up to 64 active threads concurrently.

Additional processor components, such as L2 cache, memory access crossbar, four independent dual-channel memory controllers utilizing fully-buffered DDR2-based DIMMs (FB-DIMMs), and a PCIe I/O interface have been carefully tuned for optimal performance.

1.1.2 Performance Enhancements

The server introduces several new technologies with its sun4v architecture and multithreaded UltraSPARC T2 multicore processor.

Some of these enhancements are:

- Large page optimization
- Reduction on TLB misses
- Optimized block copy
- Dedicated floating point unit (FPU) for each processor thread

TABLE 1-1 lists feature specifications for the server.

TABLE 1-1 Server Features

Feature	Description
Processor	1 UltraSPARC T2 multicore processor (4, 6, or 8 cores)
Architecture	SPARC® V9 architecture, ECC protected Platform group: sun4v Platform name: SUNW,Sun-Fire-T5120 (1u version) Platform name: SUNW,Sun-Fire-T5220 (2u version)
Memory	16 slots that can be populated with one of the following types of FB-DIMMS: • 1 GB (16 GB maximum) • 2 GB (32 GB maximum) • 4 GB (64 GB maximum) The memory subsystem supports the Extended Error Correction Code (Extended ECC) feature.
Ethernet ports	4 ports, 10/100/1000 Mb autonegotiating
Internal hard drives	Sun SPARC Enterprise T5120: 1-4 SAS 2.5-inch form factor drives (hot-pluggable) Sun SPARC Enterprise T5220: 1-8 SAS 2.5-inch form factor drives (hot-pluggable)
Other internal peripherals	1 slimline DVD-R/CD-RW device
USB ports	4 USB 2.0 ports (2 in front and 2 in rear)
Cooling	Sun SPARC Enterprise T5120: 4 hot-swappable fan modules Sun SPARC Enterprise T5220: 3 hot-swappable fan modules
PCIe interfaces	Sun SPARC Enterprise T5120 server: 3 low- profile PCI-Express (PCIe) slots (Two slots also support proprietary 10 Gbit Ethernet (XAUI) cards.) Sun SPARC Enterprise T5220 server: 6 low-profile PCI-Express (PCIe) slots (Two slots also support proprietary 10 Gbit Ethernet (XAUI) cards.)
Power	2 hot-swappable and redundant power supply units (PSUs) Refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Site Planning Guide* for power and environmental specifications.

TABLE 1-1 Server Features *(Continued) (Continued)*

Feature	Description
Remote management	ILOM service processor with a serial and 10/100 Mb Ethernet port
Firmware	System firmware comprising: • OpenBoot™ PROM for system settings and power-on self-test (POST) support • ILOM for remote management administration • Server diagnostics tools available through ALOM CMT compatibility shell
Cryptography	Hardware-assisted cyptographic acceleration

1.1.3 Remote Manageability With ILOM

The Sun Integrated Lights Out Management (ILOM) feature is a service processor (SP) that enables you to remotely manage and administer the server.

The ILOM software is preinstalled as firmware, and it initializes as soon as you apply power to the system. You can customize ILOM to work with your particular installation.

ILOM enables you to monitor and control your server over a network, or by using a dedicated serial port for connection to a terminal or terminal server. ILOM provides a command-line interface and browser user interface for remotely administering geographically distributed or physically inaccessible machines. In addition, the ALOM CMT compatibility shell enables you to run diagnostics (such as POST) remotely that would otherwise require physical proximity to the server's serial port.

You can configure ILOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ILOM. The ILOM circuitry runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server operating system goes offline or when the server is powered off. ILOM monitors the following server components:

- CPU temperature conditions
- Hard drive status
- Enclosure thermal conditions
- Fan speed and status
- Power supply status
- Voltage levels
- Faults detected by POST (power-on self-test)
- Solaris Predictive Self-Healing (PSH) diagnostic facilities

For information about configuring and using the ILOM service processor, refer to the latest *Integrated Lights Out Management (ILOM) User Guide* and the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*

1.1.4 System Reliability, Availability, and Serviceability

Reliability, availability, and serviceability (RAS) are aspects of a system's design that affect its ability to operate continuously and to minimize the time necessary to service the system. Reliability refers to a system's ability to operate continuously without failures and to maintain data integrity. System availability refers to the ability of a system to recover to an operational state after a failure, with minimal impact. Serviceability relates to the time it takes to restore a system to service following a system failure. Together, reliability, availability, and serviceability features provide for near continuous system operation.

To deliver high levels of reliability, availability, and serviceability, the server offers the following features:

- Hot-pluggable hard drives
- Redundant, hot-swappable power supplies (two)
- Hot-swappable fan units
- Environmental monitoring
- Error detection and correction for improved data integrity
- Easy access for most component replacements
- Extensive POST tests that automatically delete faulty components from the configuration
- PSH automated run-time diagnosis capability that takes faulty components offline.

For more information about using RAS features, refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide*.

1.1.4.1 Hot-Pluggable and Hot-Swappable Components

The server hardware supports hot-plugging or hot-swapping of the chassis-mounted hard drives, fan modules, and power supplies. Using the proper software commands, you can install or remove these components while the server is running. Hot-plug and hot-swap technologies significantly increase the server's serviceability and availability by providing the ability to replace hard drives, fan modules, and power supplies without service disruption.

1.1.4.2 Power Supply Redundancy

The server can be equipped with two hot-swappable power supplies, which enable the system to continue operating should a power supply or power sources fail.

1.1.4.3 Fan Redundancy

The server features hot-swappable system fan modules. Multiple fans enable the server to continue operating with adequate cooling in the event that one of the fans fails.

1.1.4.4 Environmental Monitoring

The server features an environmental monitoring subsystem designed to protect the server and its components against:

- Extreme temperatures
- Lack of adequate airflow through the system
- Power supply failures
- Hardware faults

Temperature sensors located throughout the server monitor the ambient temperature of the server and internal components. The software and hardware ensure that the temperatures within the enclosure do not exceed predetermined safe operating ranges. If the temperature observed by a sensor falls below a low-temperature threshold or rises above a high-temperature threshold, the monitoring subsystem software lights the Service Required LEDs on the front and back panel, as well as the front panel Overtemperature LED. If the temperature condition persists and reaches a critical threshold, the system initiates a graceful server shutdown.

All error and warning messages are sent to the service processor (SP), console, and are logged in the ILOM log file. Additionally, some FRUs such as power supplies provide LEDs that indicate a failure within the FRU.

1.1.4.5 Error Correction and Parity Checking

The UltraSPARC T2 multicore processor provides parity protection on its internal cache memories, including tag parity and data parity on the D-cache and I-cache. The internal 3 Mb L2 cache has parity protection on the tags, and ECC protection of the data.

Advanced error correcting code (ECC) corrects up to 4-bits in error on nibble boundaries, as long as the bits are all in the same FB-DIMM. If a DRAM fails, the FB-DIMM continues to function.

1.1.5 Predictive Self-Healing

The server features the latest fault management technologies. The Solaris 10 Operating System (OS), introduces a new architecture for building and deploying systems and services capable of *Predictive Self-Healing*. Self-healing technology enables systems to accurately predict component failures and mitigate many serious problems before they occur. This technology is incorporated into both the hardware and software of the server.

At the heart of the Predictive Self-Healing capabilities is the Solaris Fault Manager, a service that receives data relating to hardware and software errors, and automatically and silently diagnoses the underlying problem. Once a problem is diagnosed, a set of agents automatically responds by logging the event, and if necessary, takes the faulty component offline. By automatically diagnosing problems, business-critical applications and essential system services can continue uninterrupted in the event of software failures, or major hardware component failures.

1.2 Chassis Overview

The Sun SPARC Enterprise T5120 and T5220 servers are based on an all-new 1u and 2u chassis family.

Note – For specific dimensions and weights for these servers, see the *Sun SPARC Enterprise T5120 and T5220 Servers Site Planning Guide*.

1.2.1 Infrastructure Boards

The Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers have the following boards installed in the chassis:

- **Motherboard**—The motherboard includes a direct-attach CPU module, slots for 16 FB-DIMMs, memory control subsystems, and all service processor (ILOM) logic. In addition, a removable SCC module contains all Mac addresses, host ID, and ILOM and OpenBoot™ PROM configuration data. When replacing the motherboard, the SCC module can be transferred to a new board to retain system configuration data.

The service processor (ILOM) subsystem controls the host power and monitors host system events (power and environmental). The ILOM controller draws power from the host's 3.3V standby supply rail, which is available whenever the system is receiving AC input power, even when the system is turned off.

- **Power distribution board**—This board distributes main 12V power from the power supplies to the rest of the system. It is directly connected to the paddle card, and to the motherboard via a bus bar and ribbon cable. It also supports a top cover interlock ("kill") switch.
- **Power supply backplane** (Sun SPARC Enterprise T5220 only)— This board carries 12V power from the power supplies to the power distribution board via a pair of bus bars.

  In the Sun SPARC Enterprise T5120, the power supplies connect directly to the power distribution board.
- **Paddle card**—This board serves as the interconnect between the power distribution board and the fan power boards, SAS backplane, and I/O board.
- **Fan power boards (2)**—These boards carry power to the system fan modules. In addition, they contain fan module status LEDs, and transfer I^2C data for the fan modules.
- **Hard drive backplane**—This board includes the connectors for the hard drives, as well as the interconnect for the I/O board, Power and Locator buttons, and system/component status LEDs. There are two different hard drive backplanes, depending on form factor:
  - Sun SPARC Enterprise T5120—Four-disk backplane
  - Sun SPARC Enterprise T5220—Eight-disk backplane

  Each drive has a Power/Activity, Fault, and Ready-to-Remove LED.
- **Front I/O board**—This board connects directly to the hard drive backplane. It is packaged with the DVD drive as a single unit.
- **PCIe/XAUI risers**—There are three risers per system, each attached to the rear of the motherboard. In Sun SPARC Enterprise T5120 servers, each riser supports one PCIe or 10-Gbit Ethernet card; in Sun SPARC Enterprise T5220 servers, each riser supports two PCIe and/or 10-Gbit Ethernet cards.

Note – 10-Gbit Ethernet XAUI cards are only supported in Slots 0 and 1.

1.2.2 System Cables

The Sun SPARC Enterprise T5120 has the following cables:

- Top cover interlock, connected to the power distribution board

- Ribbon cable, connected between the power distribution board and the motherboard
- Hard drive data cable, connected between the motherboard and the SAS backplane

The Sun SPARC Enterprise T5220 server has the following cables:

- Top cover interlock, connected to the power distribution board
- Ribbon cable, connected between the power supply backplane and the power distribution board
- Ribbon cable, connected between the power distribution board and the motherboard
- Hard drive data cables (2) connected between the motherboard and the hard drive backplane

1.3 About the Front Panel

The server front panel contains a recessed system power button, system status and fault LEDs, Locator button/LED, and access to internal hard drives, the removable media drive (if equipped), and the two front USB ports.

1.3.1 Sun SPARC Enterprise T5120 Server Front Panel

FIGURE 1-3 shows front panel features on the Sun SPARC Enterprise T5120 server. For a detailed description of front panel controls and LEDs, see Section 1.3.3, "Front Panel LEDs" on page 1-13.

FIGURE 1-3 Front Component Access (Sun SPARC Enterprise T5120 Server)

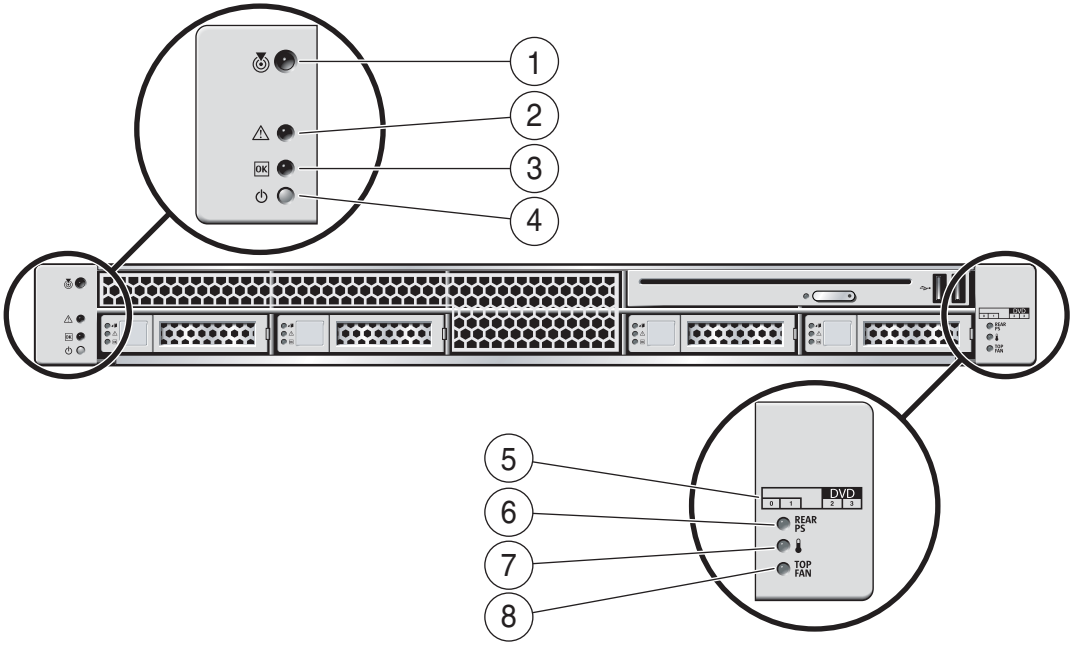


Figure Legend

1	Locator LED/Locator button	**5**	Hard drive map
2	Service Required LED	**6**	Power Supply Service Required LED
3	Power/OK LED	**7**	System Overtemperature LED
4	Power button	**8**	Fan Module Service Required LED

1.3.2 Sun SPARC Enterprise T5220 Server Front Panel

FIGURE 1-4 depicts front panel features on Sun SPARC Enterprise T5220 server. For a detailed description of front panel controls and LEDs, see Section 1.3.3, "Front Panel LEDs" on page 1-13.

FIGURE 1-4 Front Component Access (Sun SPARC Enterprise T5220 Server)

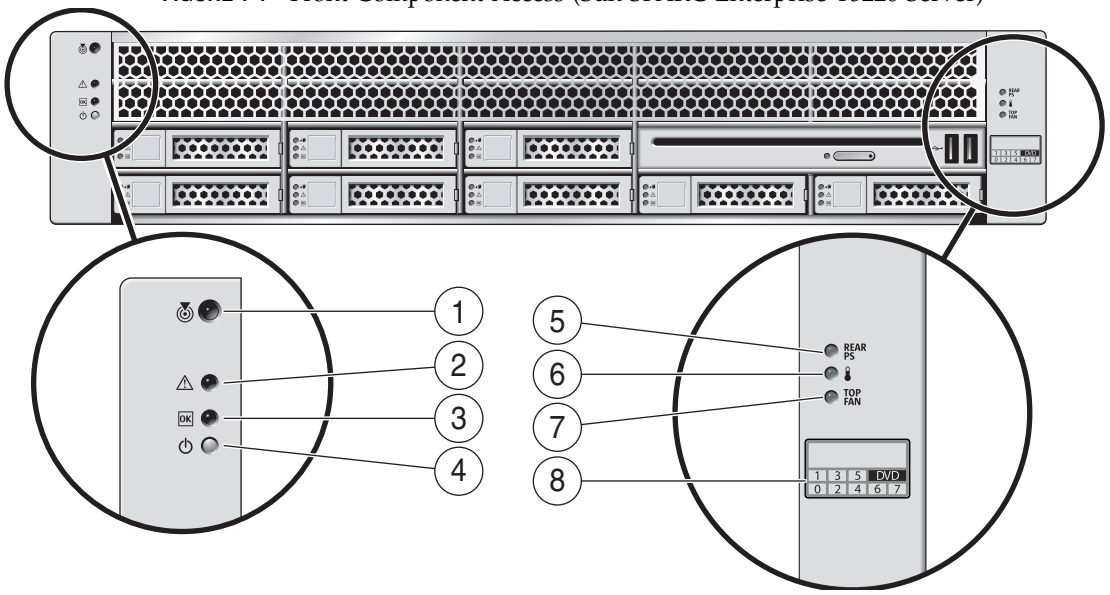


Figure Legend

1	Locator LED/Locator button	**5**	Power Supply Service Required LED
2	Service Required LED	**6**	System Overtemperature LED
3	Power/OK LED	**7**	Fan Module Service Required LED
4	Power button	**8**	Hard Drive Map

1.3.3 Front Panel LEDs

See TABLE 1-2 for a description of the front panel system LEDs and controls.

TABLE 1-2 Front Panel LEDs and controls

LED	Icon	Description
Locator LED and button (white)		The Locator LED enables you to find a particular system. The LED is activated using one of the following methods: • The ALOM CMT command `setlocator on`. • Manually press the Locator button to toggle the Locator LED on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – System received a signal as a result of one of the methods previously mentioned and is indicating *here I am.*
Service Required LED (amber)		If on, indicates that service is required. POST and ALOM CMT are two diagnostics tools that can detect a fault or failure resulting in this indication. The ALOM CMT `showfaults` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – Indicates that the system is not running in its normal state. System power might be on or in standby mode. The service processor might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The service processor is running. • Slow blink – Indicates that a normal transitory activity is taking place. This could indicate the system diagnostics are running, or that the system is booting.
Power button		The recessed Power button toggles the system on or off. • If the system is powered off, press once to power on. • If the system is powered on, press once to initiate a graceful system shutdown. • If the system is powered on, press and hold for 4 seconds to initiate an emergency shutdown. For more information about powering on and powering off the system, see the *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide*.

TABLE 1-2 Front Panel LEDs and controls *(Continued)*

LED	Icon	Description
Power Supply Fault (amber)	REAR PS	Provides the following operational PSU indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates a power supply failure event has been acknowledged and a service action is required on at least one PSU.
Overtemp (amber)		Provides the following operational temperature indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates a temperature failure event has been acknowledged and a service action is required.
Fan Fault (amber)	TOP FAN	Provides the following operational fan indications: • Off – Indicates a steady state, no service action is required. • Steady on – Indicates a fan failure event has been acknowledged and a service action is required on at least one of the fan modules.

1.4 About the Rear Panel

The rear panel provides access to system I/O ports, PCIe ports, 10 Gbit Ethernet (XAUI) ports (if equipped), power supplies, Locator button/LED, and system status LEDs.

1.4.1 Rear Component Access — Sun SPARC Enterprise T5120 Server

FIGURE 1-5 shows rear panel features on the Sun SPARC Enterprise T5120 server. For more detailed information about ports and their uses, see the *Sun SPARC Enterprise T5120 and T5220 Servers Installation Guide*. For a detailed description of PCIe slots, see Section 5.9.1, "Sun SPARC Enterprise T5120 Server PCIe/XAUI Card Configuration Guidelines" on page 5-35.

FIGURE 1-5 Rear Component Access (Sun SPARC Enterprise T5120 Server)

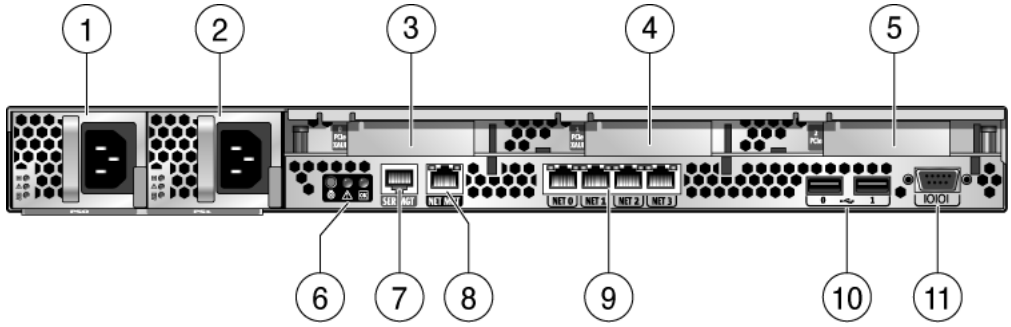


Figure Legend

1	PSU 0	**7**	Serial Management Port
2	PSU 1	**8**	Network Management Port
3	PCIe/XAUI 0	**9**	Gbit Ethernet Ports (0, 1, 2, 3)
4	PCIe/XAUI 1	**10**	USB Ports (0, 1))
5	PCIe 2	**11**	DB-9 Port
6	Rear Panel System Status LEDs		

1.4.2 Rear Component Access — Sun SPARC Enterprise T5220 Server

FIGURE 1-6 shows rear panel features on the Sun SPARC Enterprise T5220 server. For a detailed description of PCIe slots, see Section 5.9.2, "Sun SPARC Enterprise T5220 Server PCIe/XAUI Card Guidelines" on page 5-36.

FIGURE 1-6 Rear Component Access (Sun SPARC Enterprise T5220 Server)

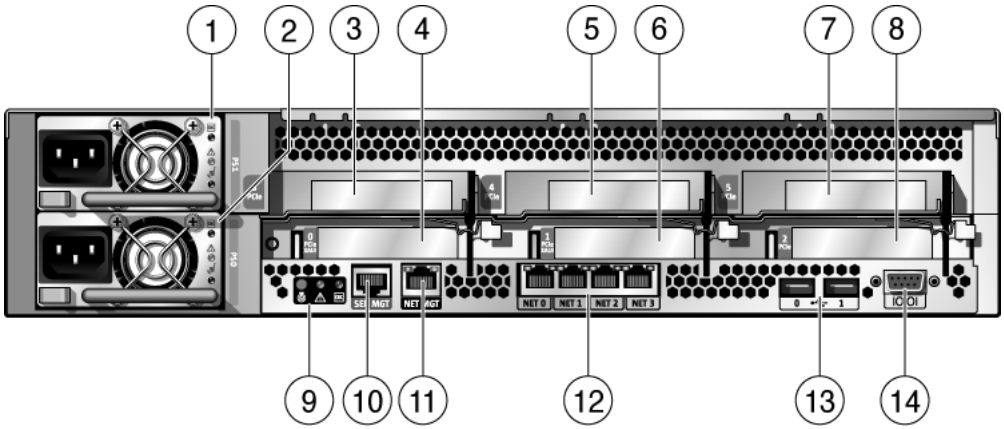


Figure Legend

1	PSU 1	**8**	PCIe 2
2	PSU 0	**9**	Rear Panel Status LEDs
3	PCIe 3	**10**	Serial Management Port
4	PCIe/XAUI 0	**11**	Network Management Port
5	PCIe 4	**12**	Gigabit Ethernet Ports (0-3)
6	PCIe/XAUI 1	**13**	USB Ports (0-1)
7	PCIe 5	**14**	DB-9 Serial Port (ttya)

1.4.3 Rear Panel LEDs

TABLE 1-3 describes the rear panel system LEDs.

TABLE 1-3 Rear Panel System LEDs

LED	Icon	Description
Locator LED and button (white)		The Locator LED enables you to find a particular system. The LED is activated using one of the following methods: • The ALOM CMT command `setlocator on`. • Manually press the Locator button to toggle the Locator LED on or off. This LED provides the following indications: • Off – Normal operating state. • Fast blink – System received a signal as a result of one of the methods previously mentioned and is indicating *here I am.*
Service Required LED (amber)		If on, indicates that service is required. POST and ALOM CMT are two diagnostics tools that can detect a fault or failure resulting in this indication. The ALOM CMT `showfaults` command provides details about any faults that cause this indicator to light. Under some fault conditions, individual component fault LEDs are lit in addition to the system Service Required LED.
Power OK LED (green)		Provides the following indications: • Off – Indicates that the system is not running in its normal state. System power might be on or in standby mode. The service processor might be running. • Steady on – Indicates that the system is powered on and is running in its normal operating state. No service actions are required. • Fast blink – Indicates the system is running at a minimum level in standby and is ready to be quickly returned to full function. The service processor is running. • Slow blink – Indicates that a normal transitory activity is taking place. This could indicate the system diagnostics are running, or that the system is booting.

1.4.4 Ethernet Port LEDs

The service processor network management port and the four 10/100/1000 Mbps Ethernet ports each have two LEDs, as described in TABLE 1-4.

TABLE 1-4 Ethernet Port LEDs

LED	Color	Description
Left LED	Amber or Green	Speed indicator: • Amber on – The link is operating as a Gigabit connection (1000-Mbps) • Green on – The link is operating as a 100-Mbps connection.* • Off – The link is operating as a 10-Mbps connection.
Right LED	Green	Link/Activity indicator: • Steady on – A link is established. • Blinking – There is activity on this port. • Off – No link is established.

* The NET MGT port only operates in 100-Mbps or 10-Mbps so the speed indicator LED will be green or off (never amber).

CHAPTER 2

Server Diagnostics

This chapter describes the diagnostics that are available for monitoring and troubleshooting the server.

This chapter is intended for technicians, service personnel, and system administrators who service and repair computer systems.

The following topics are covered:

- Section 2.1, "Overview of Server Diagnostics" on page 2-1
- Section 2.2, "Using LEDs to Identify the State of Devices" on page 2-7
- Section 2.3, "Using the Service Processor Firmware for Diagnosis and Repair Verification" on page 2-9
- Section 2.4, "Running POST" on page 2-22
- Section 2.5, "Using the Solaris Predictive Self-Healing Feature" on page 2-32
- Section 2.6, "Collecting Information From Solaris OS Files and Commands" on page 2-37
- Section 2.7, "Managing Components With Automatic System Recovery Commands" on page 2-38
- Section 2.8, "Exercising the System With SunVTS" on page 2-41

2.1 Overview of Server Diagnostics

You can use a variety of diagnostic tools, commands, and indicators to monitor and troubleshoot a server:

- **LEDs** – Provide a quick visual notification of the status of the server and of some of the FRUs.

- **ILOM firmware** – This system firmware runs on the service processor. In addition to providing the interface between the hardware and OS, ILOM also tracks and reports the health of key server components. ILOM works closely with POST and Solaris Predictive Self-Healing technology to keep the system up and running even when there is a faulty component.
- **Power-on self-test (POST)** – POST performs diagnostics on system components upon system reset to ensure the integrity of those components. POST is configureable and works with ILOM to take faulty components offline if needed.
- **Solaris OS Predictive Self-Healing (PSH)** – This technology continuously monitors the health of the CPU and memory, and works with ILOM to take a faulty component offline if needed. The Predictive Self-Healing technology enables systems to accurately predict component failures and mitigate many serious problems before they occur.
- **Log files and console messages** – Provide the standard Solaris OS log files and investigative commands that can be accessed and displayed on the device of your choice.
- **SunVTS™** – An application that exercises the system, provides hardware validation, and discloses possible faulty components with recommendations for repair.

The LEDs, ILOM, Solaris OS PSH, and many of the log files and console messages are integrated. For example, a fault detected by the Solaris software displays the fault, logs it, passes information to ILOM where it is logged, and depending on the fault, might light one or more LEDs.

The diagnostic flow chart in FIGURE 2-1 and TABLE 2-1 describes an approach for using the server diagnostics to identify a faulty field-replaceable unit (FRU). The diagnostics you use, and the order in which you use them, depend on the nature of the problem you are troubleshooting, so you might perform some actions and not others.

The flow chart assumes that you have already performed some troubleshooting such as verification of proper installation, and visual inspection of cables and power, and possibly performed a reset of the server (refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Installation Guide* and *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide* for details).

FIGURE 2-1 is a flow chart of the diagnostics available to troubleshoot faulty hardware. TABLE 2-1 has more information about each diagnostic in this chapter.

FIGURE 2-1 Diagnostic Flow Chart

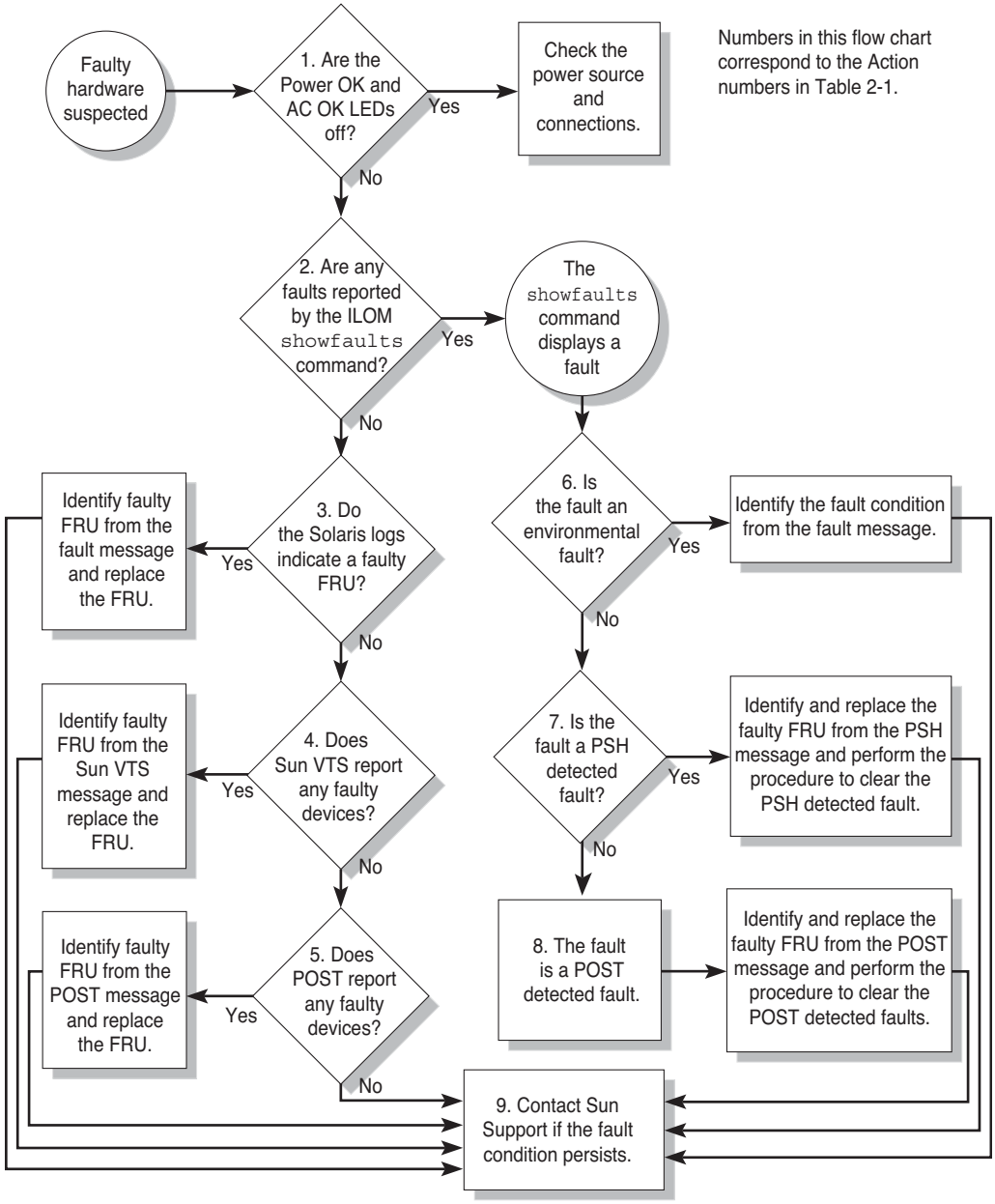

Faulty hardware suspected
1. Are the Power OK and AC OK LEDs off?
Yes
Check the power source and connections.
No
2. Are any faults reported by the ILOM showfaults command?
Yes
The showfaults command displays a fault
No
3. Do the Solaris logs indicate a faulty FRU?
Yes
Identify faulty FRU from the fault message and replace the FRU.
No
4. Does Sun VTS report any faulty devices?
Yes
Identify faulty FRU from the Sun VTS message and replace the FRU.
No
5. Does POST report any faulty devices?
Yes
Identify faulty FRU from the POST message and replace the FRU.
No
6. Is the fault an environmental fault?
Yes
Identify the fault condition from the fault message.
No
7. Is the fault a PSH detected fault?
Yes
Identify and replace the faulty FRU from the PSH message and perform the procedure to clear the PSH detected fault.
No
8. The fault is a POST detected fault.
Identify and replace the faulty FRU from the POST message and perform the procedure to clear the POST detected faults.
9. Contact Sun Support if the fault condition persists.
Numbers in this flow chart correspond to the Action numbers in Table 2-1.

TABLE 2-1 Diagnostic Flowchart Actions

Action No.	Diagnostic Action	Resulting Action	For more information, see these sections
1.	Check Power OK and AC Present LEDs on the server.	The Power OK LED is located on the front and rear of the chassis. The AC Present LED is located on the rear of the server on each power supply. If these LEDs are not on, check the power source and power connections to the server.	Section 2.2, "Using LEDs to Identify the State of Devices" on page 2-7
2.	Run the ALOM CMT `showfaults` command to check for faults.	The `showfaults` command displays the following kinds of faults: • Environmental faults • Solaris Predictive Self-Healing (PSH) detected faults • POST detected faults Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see Appendix A.	Section 2.3.4, "Running the `showfaults` Command" on page 2-17
3.	Check the Solaris log files for fault information.	The Solaris message buffer and log files record system events and provide information about faults. • If system messages indicate a faulty device, replace the FRU. • To obtain more diagnostic information, go to Action No. 4.	Section 2.6, "Collecting Information From Solaris OS Files and Commands" on page 2-37
4.	Run SunVTS.	SunVTS is an application you can run to exercise and diagnose FRUs. To run SunVTS, the server must be running the Solaris OS. • If SunVTS reports a faulty device replace the FRU. • If SunVTS does not report a faulty device, go to Action No. 5.	Section 2.8, "Exercising the System With SunVTS" on page 2-41
5.	Run POST.	POST performs basic tests of the server components and reports faulty FRUs.	Section 2.4, "Running POST" on page 2-22 TABLE 2-4, TABLE 2-5

TABLE 2-1 Diagnostic Flowchart Actions *(Continued)*

Action No.	Diagnostic Action	Resulting Action	For more information, see these sections
6.	Determine if the fault is an environmental fault.	Determine if the fault is an environmental fault or a configuration fault. If the fault listed by the `showfaults` command displays a temperature or voltage fault, then the fault is an environmental fault. Environmental faults can be caused by faulty FRUs (power supply, fan, or blower) or by environmental conditions such as when computer room ambient temperature is too high, or the server airflow is blocked. When the environmental condition is corrected, the fault will automatically clear. If the fault indicates that a fan or power supply is bad, you can perform a hot-swap of the FRU. You can also use the fault LEDs on the server to identify the faulty FRU (fans and power supplies).	Section 2.3.4, "Running the `showfaults` Command" on page 2-17 Section 2.2, "Using LEDs to Identify the State of Devices" on page 2-7
7.	Determine if the fault was detected by PSH.	If the fault message displays the following text, the fault was detected by the Solaris Predictive Self-Healing software: `Host detected fault` If the fault is a PSH detected fault, refer to the PSH Knowledge Article web site for additional information. The Knowledge Article for the fault is located at the following link: `http://www.sun.com/msg/`*message_ID* where *message_ID* is the fault message identifier displayed by the `showfaults` command. After the FRU is replaced, perform the procedure to clear PSH detected faults.	Section 2.5, "Using the Solaris Predictive Self-Healing Feature" on page 2-32 Section 2.5.2, "Clearing PSH Detected Faults" on page 2-35
8.	Determine if the fault was detected by POST.	POST performs basic tests of the server components and reports faulty FRUs. When POST detects a faulty FRU, it logs the fault and if possible, takes the FRU offline. POST detected FRUs display the following text in the fault message: `Forced fail` *reason* In a POST fault message, *reason* is the name of the power-on routine which detected the failure.	Section 2.4, "Running POST" on page 2-22 Section 2.4.5, "Clearing POST Detected Faults" on page 2-30
9.	Contact technical support.	The majority of hardware faults are detected by the server's diagnostics. In rare cases a problem might require additional troubleshooting. If you are unable to determine the cause of the problem, contact Sun for support.	Section 3.3, "Obtaining the Chassis Serial Number" on page 3-4

2.1.1 Memory Fault Handling

A variety of features play a role in how the memory subsystem is configured and how memory faults are handled. Understanding the underlying features helps you identify and repair memory problems. This section describes how the how the server deals with memory faults.

Note – For memory configuration information, see Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30.

The server uses advanced ECC technology that corrects up to 4-bits in error on nibble boundaries, as long as the bits are all in the same DRAM. On 2 GB and 4 GB FB-DIMMs, if a DRAM fails, the DIMM continues to function.

The following server features independently manage memory faults:

- **POST** – Based on ILOM configuration variables, POST runs when the server is powered on.

  For correctable memory errors (CEs), POST forwards the error to the Solaris Predictive Self-Healing (PSH) daemon for error handling. If an uncorrectable memory fault is detected or if a "storm" of CEs is detected, POST displays the fault with the device name of the faulty FB-DIMMs, logs the fault, and disables the faulty FB-DIMMs by placing them in the ASR blacklist. Depending on the memory configuration and the location of the faulty FB-DIMM, POST disables half of physical memory in the system or half the physical memory and half the processor threads. When this offlining process occurs in normal operation, you must replace the faulty FB-DIMMs based on the fault message and enable the disabled FB-DIMMs with the ALOM CMT `enablecomponent` command.

- **Solaris Predictive Self-Healing (PSH) technology** – A feature of the Solaris OS, PSH uses the fault manager daemon (`fmd`) to watch for various kinds of faults. When a fault occurs, the fault is assigned a unique fault ID (UUID), and logged. PSH reports the fault and provides a recommended proactive replacement for the FB-DIMMs associated with the fault.

If you suspect that the server has a memory problem, follow the flowchart (see FIGURE 2-1). Run the ALOM CMT `showfaults` command. The `showfaults` command lists memory faults and lists the specific FB-DIMMs that are associated with the fault.

Note – You can use the FB-DIMM DIAG button on the motherboard to identify a faulty FB-DIMM pair. See Section 5.1.1, "Locating a Faulty FB-DIMM" on page 5-2.

Once you identify which FB-DIMMs you want to replace, see Section 5.1, “Servicing FB-DIMMs” on page 5-2 for FB-DIMM removal and replacement instructions. It is important that you perform the instructions in that section to clear the faults and enable the replaced FB-DIMMs.

2.2 Using LEDs to Identify the State of Devices

The server provides the following groups of LEDs:

- Front panel system LEDs. See Section 1.3.3, “Front Panel LEDs” on page 1-13.
- Rear panel system LEDs. See Section 1.4.3, “Rear Panel LEDs” on page 1-17.
- Hard drive LEDs. See Section 4.2.1, “Hard Drive LEDs” on page 4-3.
- Power supply LEDs. See Section 4.4.1, “Power Supply LEDs” on page 4-6.
- Fan module LEDs. See Section 4.3.3, “Fan Module LEDs” on page 4-4.
- Back panel Ethernet port LEDs. See Section 1.4.4, “Ethernet Port LEDs” on page 1-18.
- FB-DIMM Locate LEDs. See Section 5.1.1, “Locating a Faulty FB-DIMM” on page 5-2.

These LEDs provide a quick visual check of the state of the system.

TABLE 2-2 describes which fault LEDs are lit under given error conditions. Use the ALOM CMT `showfaults` command to obtain more information about the nature of a given fault. See Section 2.3.4, "Running the `showfaults` Command" on page 2-17.

TABLE 2-2 System Faults and Fault LED States

Component Fault	Fault LEDs Lit	Additional Information
Power supply	• System Service Required LED (front and rear panel) • Front panel Power Supply Fault LED • Individual power supply Fault LED	See these sections: • Section 2.3.4, "Running the `showfaults` Command" on page 2-17 • Section 1.3, "About the Front Panel" on page 1-10 • Section 4.4, "About the Power Supplies" on page 4-5 • Section 4.7, "Hot-Swapping a Power Supply" on page 4-16 • Section 4.10, "Reference For Power Supply Configuration" on page 4-24
Fan module	• System Service Required LED (front and rear panel) • Front panel Fan Fault LED • Individual fan module Fault LED • Overtemp LED (if overtemp condition exists)	See these sections: • Section 2.3.4, "Running the `showfaults` Command" on page 2-17 • Section 1.3, "About the Front Panel" on page 1-10 • Section 4.3, "About the Fan Modules" on page 4-4 • Section 4.6, "Hot-Swapping a Fan Module" on page 4-13 • Section 4.9, "Reference for Fan Module Configuration" on page 4-23

TABLE 2-2 System Faults and Fault LED States *(Continued)*

Component Fault	Fault LEDs Lit	Additional Information
Hard drive	• System Service Required LED (front and rear panel) • Individual hard drive Fault LED	See these sections: • Section 2.3.4, "Running the `showfaults` Command" on page 2-17 • Section 1.3, "About the Front Panel" on page 1-10 • Section 4.2, "About the Hard Drives" on page 4-2 • Section 4.5, "Hot-Plugging a Hard Drive" on page 4-7 • Section 4.8, "Reference for Hard Drive Configuration" on page 4-21
FB-DIMM	• System Service Required LED (front and rear panel) • FB-DIMM Fault LED on motherboard (when FB-DIMM Locate button is pressed)	See these sections: • Section 2.3.4, "Running the `showfaults` Command" on page 2-17 • Section 1.3, "About the Front Panel" on page 1-10 • Section 5.1, "Servicing FB-DIMMs" on page 5-2 • Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30
Other components	• System Service Required LED (front and rear panel)	**Note -** Not all components have an individual component Fault LED. If the System Service Required LED is lit, use the `showfaults` command to obtain additional information about the component affected. See these sections: • Section 2.3.4, "Running the `showfaults` Command" on page 2-17 • Section 1.3, "About the Front Panel" on page 1-10.

2.3 Using the Service Processor Firmware for Diagnosis and Repair Verification

The Sun Integrated Lights Out Management (ILOM) firmware runs on the service processor in the server, enabling you to remotely manage and administer your server.

ILOM enables you to run diagnostics remotely such as power-on self-test (POST), that would otherwise require physical proximity to the server's serial port. You can also configure ILOM to send email alerts of hardware failures, hardware warnings, and other events related to the server or to ILOM.

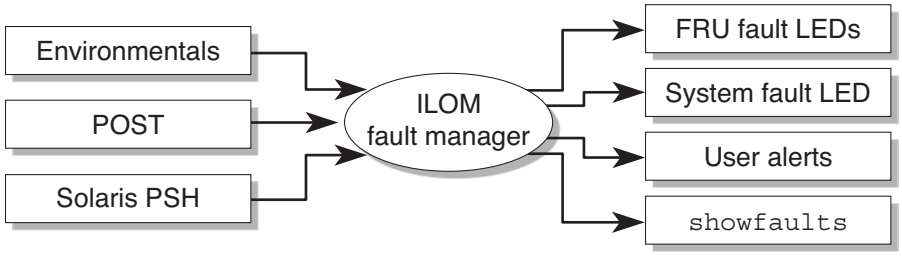
The service processor runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server OS goes offline or when the server is powered off.

Note – Refer to the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for comprehensive ALOM CMT information.

Faults detected by ILOM, POST, and the Solaris Predictive Self-healing (PSH) technology are forwarded to ILOM for fault handling (FIGURE 2-2).

In the event of a system fault, ILOM ensures that the Service Required LED is lit, FRU ID PROMs are updated, the fault is logged, and alerts are displayed. Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see Appendix A.

FIGURE 2-2 ILOM Fault Management



The service processor can detect when a fault is no longer present and clears the fault in several ways:

- **Fault recovery** – The system automatically detects that the fault condition is no longer present. The service processor extinguishes the Service Required LED and updates the FRU's PROM, indicating that the fault is no longer present.
- **Fault repair** – The fault has been repaired by human intervention. In most cases, the service processor detects the repair and extinguishes the Service Required LED If the service processor does not perform these actions, you must perform these tasks manually with `clearfault` or `enablecomponent` commands.

The service processor can detect the removal of a FRU, in many cases even if the FRU is removed while service processor is powered off (i.e., if the system power cables are unplugged during service procedures). This enables ILOM to know that a fault, diagnosed to a specific FRU, has been repaired.

Note – ILOM does not automatically detect hard drive replacement.

Many environmental faults can automatically recover. A temperature that is exceeding a threshold might return to normal limits. An unplugged a power supply can be plugged in, and so on. Recovery of environmental faults is automatically detected. Recovery events are reported using one of two forms:

- *fru* `at` *location* `is OK.`
- *sensor* `at` *location* `is within normal range.`

Environmental faults can be repaired through hot removal of the faulty FRU. FRU removal is automatically detected by the environmental monitoring and all faults associated with the removed FRU are cleared. The message for that case, and the alert sent for all FRU removals is:

fru `at` *location* `has been removed.`

There is no ILOM command to manually repair an environmental fault.

The Solaris Predictive Self-Healing technology does not monitor the hard drive for faults. As a result, the service processor does not recognize hard drive faults, and will not light the fault LEDs on either the chassis or the hard drive itself. Use the Solaris message files to view hard drive faults. See Section 2.6, "Collecting Information From Solaris OS Files and Commands" on page 2-37.

2.3.1 About the ALOM CMT Shell

There are three methods of interacting with the service processor:

- ILOM shell (default)
- ILOM browser user interface (BUI)
- ALOM CMT compatibility shell

It is recommended that diagnostic and repair actions be performed with the ALOM CMT compatibility shell.

Note – The code examples in this document depict use of the ALOM CMT compatibility shell.

The ALOM CMT compatibility shell emulates the ALOM CMT interface supported on the previous generation of CMT servers. Using the ALOM CMT compatibility shell (with few exceptions) you can use commands that resemble the commands of ALOM CMT. The comparisons between the ILOM CLI and The ALOM CMT compatibility CLI are described in the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*.

The service processor sends alerts to all ALOM CMT users that are logged in, sending the alert through email to a configured email address, and writing the event to the ILOM event log.

2.3.2 Creating an ALOM CMT Shell

To create an ALOM CMT compatibility shell, do the following:

1. **Log onto the Service Processor with username:** `root`**.**

When powered on, the SP boots to the ILOM login prompt. The factory default password is `changeme`.

```
SUNSPxxxxxxxxxxxx login: root
Password:
Waiting for daemons to initialize...

Daemons ready

Sun(TM) Integrated Lights Out Manager

Version 2.0.0.0

Copyright 2007 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

Warning: password is set to factory default.
```

2. **Create a new user, set the account role to** `Administrator` **and the CLI mode to** `alom`

```
-> create /SP/users/admin
Creating user...
Enter new password: ********
Enter new password again: ********
Created /SP/users/admin
-> set /SP/users/admin role=Administrator
Set 'role' to 'Administrator'
-> set /SP/users/admin cli_mode=alom
Set 'cli_mode' to 'alom'
```

Note – The asterisks in the example will not appear when you enter your password.

You can combine the `create` and `set` commands on a single line:

```
-> create /SP/users/admin role=Administrator cli_mode=alom
Creating user...
Enter new password: ********
Enter new password again: ********
Created /SP/users/admin
```

3. **Log of to the root account after you have finished creating the new account.**

```
-> exit
```

4. **Log into the ALOM CLI shell (indicated by the sc> prompt) from the ILOM login prompt**

```
SUNSPxxxxxxxxxxx login: admin
Password:
Waiting for daemons to initialize...

Daemons ready

Sun(TM) Integrated Lights Out Manager

Version 2.0.0.0

Copyright 2007 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.

sc>
```

Note – Multiple service processor accounts can be active concurrently. A user can be logged in under one account using the ILOM shell, and another account using the ALOM CMT shell.

2.3.3 Running ALOM CMT Service-Related Commands

This section describes the commands that are commonly used for service-related activities.

2.3.3.1 Connecting to ALOM CMT

Before you can run ALOM CMT commands, you must connect to the ALOM CMT. There are several ways to connect to the service processor:

- Connect an ASCII terminal directly to the serial management port.
- Use the `ssh` command to connect to ALOM CMT through an Ethernet connection on the network management port.

Note – Refer to the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for instructions on configuring and connecting to ILOM.

2.3.3.2 Switching Between the System Console and ALOM CMT

- To switch from the console output to the ALOM CMT `sc>` prompt, type **`#.`** (Hash-Period).
- To switch from the `sc>` prompt to the console, type **`console`**.

2.3.3.3 Service-Related ALOM CMT Commands

TABLE 2-3 describes the typical ALOM CMT commands for servicing a server. For descriptions of all ALOM CMT commands, issue the `help` command or refer to the *Advanced Lights Out Management (ALOM) CMT Guide*.

TABLE 2-3 Service-Related ALOM CMT Commands

ALOM CMT Command	Description
`help` [*command*]	Displays a list of all ALOM CMT commands with syntax and descriptions. Specifying a command name as an option displays help for that command.
`break` [`-y`][`-c`][`-D`]	Takes the host server from the OS to either `kmdb` or OpenBoot PROM (equivalent to a Stop-A), depending on the mode Solaris software was booted. • `-y` skips the confirmation question • `-c` executes a `console` command after the `break` command completes • `-D` forces a core dump of the Solaris OS
`clearfault` *UUID*	Manually clears host-detected faults. The UUID is the unique fault ID of the fault to be cleared.
`console [-f]`	Connects you to the host system. The `-f` option forces the console to have read and write capabilities.
`consolehistory [-b` *lines*`|-e` *lines*`|-v] [-g` *lines*`] [boot|run]`	Displays the contents of the system's console buffer. The following options enable you to specify how the output is displayed: • `-g` *lines* specifies the number of lines to display before pausing. • `-e` *lines* displays *n* lines from the end of the buffer. • `-b` *lines* displays *n* lines from beginning of buffer. • `-v` displays entire buffer. • `boot|run` specifies the log to display (`run` is the default log).
`bootmode [normal|reset_nvram| bootscript=`*string*`]`	Enables control of the firmware during system initialization with the following options: • `normal` is the default boot mode. • `reset_nvram` resets OpenBoot PROM parameters to their default values. • `bootscript=`*string* enables the passing of a string to the `boot` command.
`powercycle` [`-f`]	Performs a `poweroff` followed by `poweron`. The `-f` option forces an immediate `poweroff`, otherwise the command attempts a graceful shutdown.
`poweroff` [`-y`] [`-f`]	Powers off the host server. The `-y` option enables you to skip the confirmation question. The `-f` option forces an immediate shutdown.
`poweron [-c]`	Powers on the host server. Using the `-c` option executes a `console` command after completion of the `poweron` command.

TABLE 2-3 Service-Related ALOM CMT Commands *(Continued)*

ALOM CMT Command	Description
`removefru PS0|PS1`	Indicates if it is okay to perform a hot-swap of a power supply. This command does not perform any action, but it provides a warning if the power supply should not be removed because the other power supply is not enabled.
`reset` [`-y`] [`-c`]	Generates a hardware reset on the host server. The `-y` option enables you to skip the confirmation question. The `-c` option executes a `console` command after completion of the `reset` command.
`resetsc` [`-y`]	Reboots the service processor. The `-y` option enables you to skip the confirmation question.
`setkeyswitch [-y] normal | stby | diag | locked`	Sets the virtual keyswitch. The `-y` option enables you to skip the confirmation question when setting the keyswitch to `stby`.
`setlocator` [`on | off`]	Turns the Locator LED on the server on or off.
`showenvironment`	Displays the environmental status of the host server. This information includes system temperatures, power supply, front panel LED, hard drive, fan, voltage, and current sensor status. See Section 2.3.6, "Running the `showenvironment` Command" on page 2-18.
`showfaults` [`-v`]	Displays current system faults. See Section 2.3.4, "Running the `showfaults` Command" on page 2-17.
`showfru` [`-g` *lines*] [`-s | -d`] [*FRU*]	Displays information about the FRUs in the server. • `-g` *lines* specifies the number of lines to display before pausing the output to the screen. • `-s` displays static information about system FRUs (defaults to all FRUs, unless one is specified). • `-d` displays dynamic information about system FRUs (defaults to all FRUs, unless one is specified). See Section 2.3.7, "Running the `showfru` Command" on page 2-20.
`showkeyswitch`	Displays the status of the virtual keyswitch.
`showlocator`	Displays the current state of the Locator LED as either on or off.
`showlogs` [`-b` *lines* | `-e` *lines* | `-v`] [`-g` *lines*] [`-p logtype[r|p]`]]	Displays the history of all events logged in the ALOM CMT event buffers (in RAM or the persistent buffers).
`showplatform` [`-v`]	Displays information about the host system's hardware configuration, the system serial number, and whether the hardware is providing service.

Note – See TABLE 2-7 for the ALOM CMT ASR commands.

2.3.4 Running the `showfaults` Command

The ALOM CMT `showfaults` command displays the following kinds of faults:

- **Environmental or configuration faults** – System configuration faults, or temperature or voltage problems that might be caused by faulty FRUs (power supplies, fans, or blower), or by room temperature or blocked air flow to the server.
- **POST detected faults** – Faults on devices detected by the power-on self-test diagnostics.
- **PSH detected faults** – Faults detected by the Solaris Predictive Self-healing (PSH) technology

Use the `showfaults` command for the following reasons:

- To see if any faults have been diagnosed in the system.
- To verify that the replacement of a FRU has cleared the fault and not generated any additional faults.

- **At the `sc>` prompt, type the `showfaults` command.**

  The following `showfaults` command examples show the different kinds of output from the `showfaults` command:

  - Example of the `showfaults` command when no faults are present:

```
sc> showfaults
Last POST run: THU MAR 09 16:52:44 2006
POST status: Passed all devices

No failures found in System
```

  - Example of the `showfaults` command displaying an environmental fault:

```
sc> showfaults
Last POST Run: Wed Jul 18 11:44:47 2007

Post Status: Passed all devices
 ID FRU               Fault
  0 /SYS/FANBD0/FM0   SP detected fault: TACH at /SYS/FANBD0/FM0/F1
has exceeded low non-recoverable threshold.
```

- Example showing a fault that was detected by POST. These kinds of faults are identified by the message `Forced fail` *reason* where *reason* is the name of the power-on routine that detected the failure.

```
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
 ID FRU                      Fault
  0 /SYS/MB/CMP0/BR3/CH1/D1 SP detected fault:
/SYS/MB/CMP0/BR3/CH1/D1 Forced fail (POST)
```

- Example showing a fault that was detected by the PSH technology. These kinds of faults are identified by the text `Host detected fault` and by a UUID.

```
sc> showfaults -v
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
 ID  Time                  FRU          Fault
  0  Jun 30 22:13:02      /SYS/MB     Host detected fault, MSGID:
SUN4V-8000-N3  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

2.3.5 Running the `clearfault` Command

The ALOM CMT `clearfault` command enables you to manually clear PSH diagnosed faults from the service processor without a FRU replacement or if the service processor was unable to automatically detect the FRU replacement.

- Example showing a fault being cleared manually using the `clearfault` command:

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
```

2.3.6 Running the `showenvironment` Command

The `showenvironment` command displays a snapshot of the server's environmental status. This command displays system temperatures, hard drive status, power supply and fan status, front panel LED status, voltage and current sensors. The output uses a format similar to the Solaris OS command `prtdiag` (1m).

- **At the `sc>` prompt, type the `showenvironment` command.**

The output differs according to your system's model and configuration.

CODE EXAMPLE 2-1 shows abridged output of the `showenvironment` command.:

CODE EXAMPLE 2-1 showenvironment

```
sc> showenvironment

-----------------------------------------------------------------------------
System Temperatures (Temperatures in Celsius):
-----------------------------------------------------------------------------
Sensor                          Status  Temp LowHard LowSoft LowWarn HighWarn
HighSoft HighHard
-----------------------------------------------------------------------------
/SYS/MB/T_AMB                OK        29   -10     -5      0      50      55
/SYS/MB/CMP0/T_TCORE          OK        50   -14     -9     -4      86      96
/SYS/MB/CMP0/T_BCORE          OK        51   -14     -9     -4      86      96
/SYS/MB/CMP0/BR0/CH0/D0/T_AMB OK        41   -10     -8     -5      95     100
...
-----------------------------------------------------------------------------
System Indicator Status:
-----------------------------------------------------------------------------
/SYS/LOCATE          /SYS/SERVICE         /SYS/ACT
OFF                  OFF                  ON
-----------------------------------------------------------------------------
/SYS/PSU_FAULT       /SYS/TEMP_FAULT      /SYS/FAN_FAULT
OFF                  OFF                  OFF

-----------------------------------------------------------------------------
System Disks:
-----------------------------------------------------------------------------
Disk      Status           Service        OK2RM
-----------------------------------------------------------------------------
/SYS/HDD0  OK               OFF            OFF
/SYS/HDD1  NOT PRESENT      OFF            OFF
...
```

CODE EXAMPLE 2-1 showenvironment *(Continued)*

```
-------------------------------------------------------------------------------
Fan Status:
-------------------------------------------------------------------------------
Fans (Speeds Revolution Per Minute):
Sensor                     Status       Speed     Warn      Low
-------------------------------------------------------------------------------
/SYS/FANBD0/FM0/F0/TACH    OK            7000     4000     2400
...
-------------------------------------------------------------------------------
Voltage sensors (in Volts):
-------------------------------------------------------------------------------
Sensor               Status     Voltage LowSoft LowWarn HighWarn HighSoft
-------------------------------------------------------------------------------
/SYS/MB/V_+3V3_STBY  OK         3.39    3.13     3.17     3.53      3.58
...
-------------------------------------------------------------------------------
Power Supplies:
-------------------------------------------------------------------------------
Supply     Status            Fan_Fault  Temp_Fault  Volt_Fault  Cur_Fault
-------------------------------------------------------------------------------
/SYS/PS0    OK                  OFF       OFF          OFF         OFF
...
```

Note – Some environmental information might not be available when the server is in standby mode.

2.3.7 Running the `showfru` Command

The `showfru` command displays information about the FRUs in the server. Use this command to see information about an individual FRU, or for all the FRUs.

Note – By default, the output of the `showfru` command for all FRUs is very long.

- **At the `sc>` prompt, enter the `showfru` command.**

  In CODE EXAMPLE 2-2, the `showfru` command is used to get information about the motherboard (MB).

CODE EXAMPLE 2-2 showfru

```
sc> showfru /SYS/MB
/SYS/MB (container)
   SEGMENT: FL
      /Configured_LevelR
     /Configured_LevelR/UNIX_Timestamp32: Thu Jun  7 20:12:17 GMT
2007
      /Configured_LevelR/Sun_Part_No: 5412153
      /Configured_LevelR/Configured_Serial_No: BBX053
      /Configured_LevelR/Initial_HW_Dash_Level: 02
   SEGMENT: FD
      /InstallationR (1 iterations)
      /InstallationR[0]
     /InstallationR[0]/UNIX_Timestamp32: Thu Jun 21 19:37:57 GMT
2007
      /InstallationR[0]/Fru_Path: /SYS/MB
      /InstallationR[0]/Parent_Part_Number: 5017813
      /InstallationR[0]/Parent_Serial_Number: 110508
      /InstallationR[0]/Parent_Dash_Level: 01
      /InstallationR[0]/System_Id: 0721BBB050
      /InstallationR[0]/System_Tz: 0
...
```

2.4 Running POST

Power-on self-test (POST) is a group of PROM-based tests that run when the server is powered on or reset. POST checks the basic integrity of the critical hardware components in the server (CPU, memory, and I/O buses).

If POST detects a faulty component, the component is disabled automatically, preventing faulty hardware from potentially harming any software. If the system is capable of running without the disabled component, the system will boot when POST is complete. For example, if one of the processor cores is deemed faulty by POST, the core will be disabled, and the system will boot and run using the remaining cores.

2.4.1 Controlling How POST Runs

The server can be configured for normal, extensive, or no POST execution. You can also control the level of tests that run, the amount of POST output that is displayed, and which reset events trigger POST by using ALOM CMT variables.

TABLE 2-4 lists the ALOM CMT variables used to configure POST and FIGURE 2-3 shows how the variables work together.

Note – Use the ALOM CMT `setsc` command to set all the parameters in TABLE 2-4 except `setkeyswitch`.

TABLE 2-4 ALOM CMT Parameters Used For POST Configuration

Parameter	Values	Description
`setkeyswitch`	`normal`	The system can power on and run POST (based on the other parameter settings). For details see FIGURE 2-3. This parameter overrides all other commands.
	`diag`	The system runs POST based on predetermined settings.
	`stby`	The system cannot power on.
	`locked`	The system can power on and run POST, but no flash updates can be made.
`diag_mode`	`off`	POST does not run.
	`normal`	Runs POST according to `diag_level` value.

TABLE 2-4 ALOM CMT Parameters Used For POST Configuration *(Continued)*

Parameter	Values	Description
	service	Runs POST with preset values for diag_level and diag_verbosity.
diag_level	max	If diag_mode = normal, runs all the minimum tests plus extensive CPU and memory tests.
	min	If diag_mode = normal, runs minimum set of tests.
diag_trigger	none	Does not run POST on reset.
	user_reset	Runs POST upon user initiated resets.
	power_on_reset	Only runs POST for the first power on. This option is the default.
	error_reset	Runs POST if fatal errors are detected.
	all_resets	Runs POST after any reset.
diag_verbosity	none	No POST output is displayed.
	min	POST output displays functional tests with a banner and pinwheel.
	normal	POST output displays all test and informational messages.
	max	POST displays all test, informational, and some debugging messages.

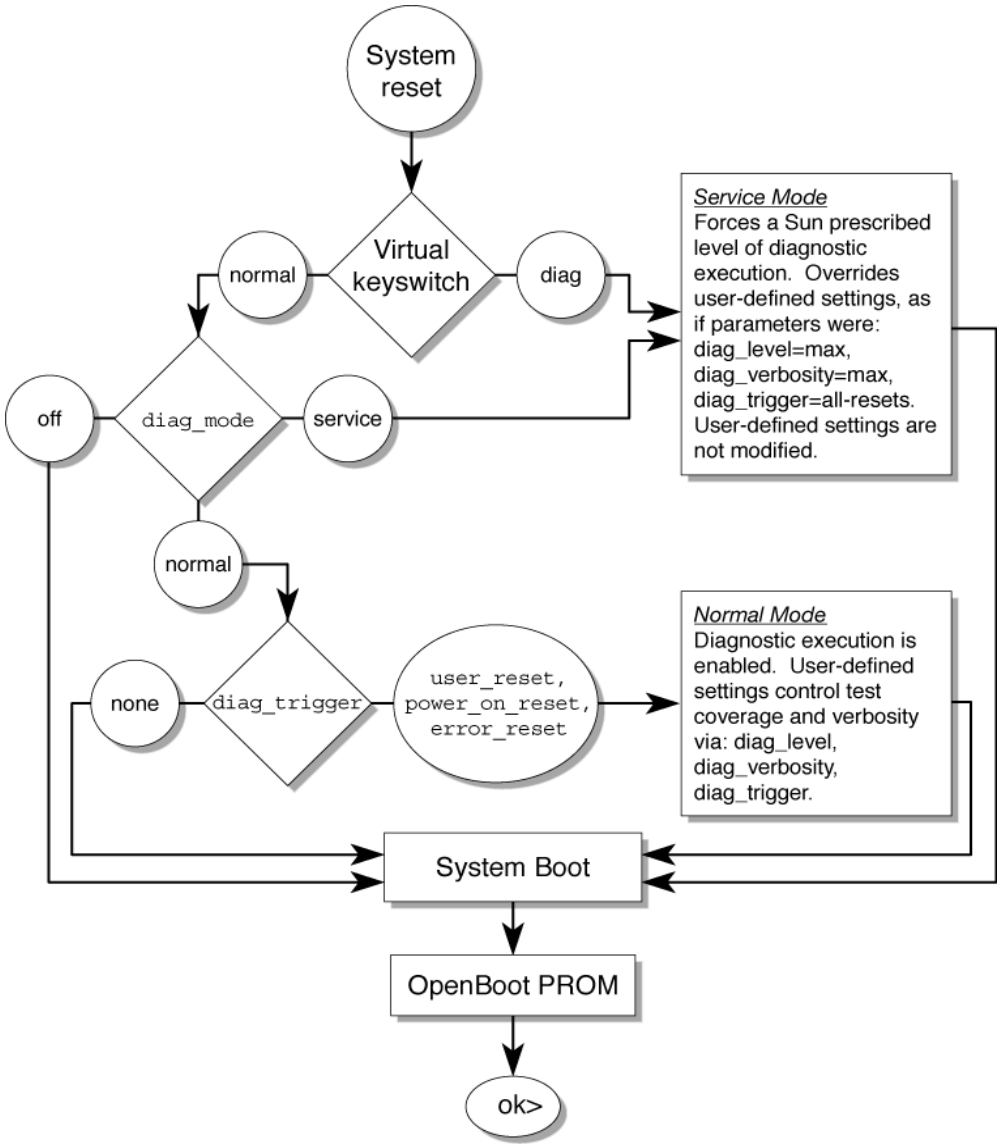


FIGURE 2-3 Flowchart of ALOM CMT Variables for POST Configuration

TABLE 2-5 shows typical combinations of ALOM CMT variables and associated POST

modes.

TABLE 2-5 ALOM CMT Parameters and POST Modes

Parameter	Normal Diagnostic Mode (Default Settings)	No POST Execution	Diagnostic Service Mode	Keyswitch Diagnostic Preset Values
diag_mode	normal	off	service	normal
setkeyswitch*	normal	normal	normal	diag
diag_level	max	n/a	max	max
diag_trigger	power-on-reset error-reset	none	all-resets	all-resets
diag_verbosity	normal	n/a	max	max
Description of POST execution	This is the default POST configuration. This configuration tests the system thoroughly, and suppresses some of the detailed POST output.	POST does not run, resulting in quick system initialization, but this is not a suggested configuration.	POST runs the full spectrum of tests with the maximum output displayed.	POST runs the full spectrum of tests with the maximum output displayed.

* The setkeyswitch parameter, when set to diag, overrides all the other ALOM CMT POST variables.

2.4.2 Changing POST Parameters

1. **Access the ALOM CMT sc> prompt:**

   At the console, issue the #. key sequence:

```
#.
```

2. **Use the ALOM CMT sc> prompt to change the POST parameters.**

   Refer to TABLE 2-4 for a list of ALOM CMT POST parameters and their values.

   The setkeyswitch parameter sets the virtual keyswitch, so it does not use the setsc command. For example, to change the POST parameters using the setkeyswitch command, enter the following:

```
sc> setkeyswitch diag
```

To change the POST parameters using the `setsc` command, you must first set the `setkeyswitch` parameter to normal, then you can change the POST parameters using the `setsc` command:

```
sc> setkeyswitch normal
sc> setsc value
```

:

CODE EXAMPLE 2-3 `setkeyswitch`

```
sc> setkeyswitch normal
sc> setsc diag_mode service
```

2.4.3 Reasons to Run POST

You can use POST for basic hardware verification and diagnosis, and for troubleshooting as described in the following sections.

2.4.3.1 Verifying Hardware Functionality

POST tests critical hardware components to verify functionality before the system boots and accesses software. If POST detects an error, the faulty component is disabled automatically, preventing faulty hardware from potentially harming software.

2.4.3.2 Diagnosing the System Hardware

You can use POST as an initial diagnostic tool for the system hardware. In this case, configure POST to run in maximum mode (`diag_mode=service`, `setkeyswitch=diag`, `diag_level=max`) for thorough test coverage and verbose output.

2.4.4 Running POST in Maximum Mode

This procedure describes how to run POST when you want maximum testing, as in the case when you are troubleshooting a server or verifying a hardware upgrade or repair.

1. **Switch from the system console prompt to the `sc>` prompt by issuing the #. escape sequence.**

```
ok #.
sc>
```

2. **Set the virtual keyswitch to `diag` so that POST will run in service mode.**

```
sc> setkeyswitch diag
```

3. **Reset the system so that POST runs.**

   There are several ways to initiate a reset. CODE EXAMPLE 2-4 shows the `powercycle` command. For other methods, refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide*.

CODE EXAMPLE 2-4 Initiating POST Using the powercycle Command

```
sc> powercycle
Are you sure you want to powercycle the system (y/n)? y
Powering host off at Fri Jul 27 08:11:52 2007
Waiting for host to Power Off; hit any key to abort.
Audit | minor: admin : Set : object = /SYS/power_state : value =
soft : success
Chassis | critical: Host has been powered off
Powering host on at Fri Jul 27 08:13:08 2007
Audit | minor: admin : Set : object = /SYS/power_state : value =
on : success
Chassis | major: Host has been powered on
```

4. **Switch to the system console to view the POST output:**

```
sc> console
```

CODE EXAMPLE 2-5 depicts abridged POST output.:

CODE EXAMPLE 2-5 POST Output (Abridged)

```
sc> console
Enter #. to return to ALOM.
2007-07-03 10:25:12.081 0:0:0>@(#)Sun Fire[TM] Huron POST
4.x.build_119***PROTOTYPE BUILD*** 2007/06/06 09:48
/export/delivery/delivery/4.x/4.x.build_119/post4.x/Niagara/huro
n/integrated  (root)
2007-07-03 10:25:12.386 0:0:0>Copyright 2007 Sun Microsystems,
Inc. All rights reserved
2007-07-03 10:25:12.550 0:0:0>VBSC cmp0 arg is: 00ff00ff.ffffffff
2007-07-03 10:25:12.653 0:0:0>POST enabling threads:
00ff00ff.ffffffff
2007-07-03 10:25:12.766 0:0:0>VBSC mode is: 00000000.00000001
2007-07-03 10:25:12.867 0:0:0>VBSC level is: 00000000.00000001
2007-07-03 10:25:12.966 0:0:0>VBSC selecting POST MAX Testing.
2007-07-03 10:25:13.066 0:0:0>VBSC setting verbosity level 3
2007-07-03 10:25:13.161 0:0:0>Niagara2, Version 2.1
2007-07-03 10:25:13.247 0:0:0>Serial Number: 0fac006b.0e654482
2007-07-03 10:25:13.353 0:0:0>Basic Memory Tests.....
2007-07-03 10:25:13.456 0:0:0>Begin: Branch Sanity Check
2007-07-03 10:25:13.569 0:0:0>End  : Branch Sanity Check
2007-07-03 10:25:13.668 0:0:0>Begin: DRAM Memory BIST
2007-07-03 10:25:13.793
0:0:0>.....................................................
.................................
2007-07-03 10:25:38.399 0:0:0>End  : DRAM Memory BIST
2007-07-03 10:25:39.547 0:0:0>Sys 166 MHz, CPU 1166 MHz, Mem 332
MHz
2007-07-03 10:25:39.658 0:0:0>L2 Bank EFuse = 00000000.000000ff
2007-07-03 10:25:39.760 0:0:0>L2 Bank status = 00000000.00000f0f
2007-07-03 10:25:39.864 0:0:0>Core available Efuse =
ffff00ff.ffffffff
2007-07-03 10:25:39.982 0:0:0>Test Memory.....
2007-07-03 10:25:40.070 0:0:0>Begin: Probe and Setup Memory
2007-07-03 10:25:40.181 0:0:0>INFO:  4096MB at Memory Branch 0
...

2007-07-03 10:29:21.683 0:0:0>INFO:
2007-07-03 10:29:21.686 0:0:0>POST Passed all devices.
2007-07-03 10:29:21.692 0:0:0>POST:Return to VBSC.
```

5. **Perform further investigation if needed.**

- If no faults were detected, the system will boot.
- If POST detects a faulty device, the fault is displayed and the fault information is passed to ALOM CMT for fault handling. Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see Appendix A.

a. Interpret the POST messages:

POST error messages use the following syntax:

c:*s* > ERROR: TEST = *failing-test*
c:*s* > H/W under test = *FRU*
c:*s* > Repair Instructions: Replace items in order listed by H/W under test above
c:*s* > MSG = *test-error-message*
c:*s* > END_ERROR

In this syntax, *c* = the core number, *s* = the strand number.

Warning and informational messages use the following syntax:

INFO or WARNING: *message*

In CODE EXAMPLE 2-6, POST reports a memory error at FB-DIMM location /SYS/MB/CMP0/BR2/CH0/D0. It was detected by POST running on core 7, strand 2.

CODE EXAMPLE 2-6 POST Error Message

```
7:2>
7:2>ERROR: TEST = Data Bitwalk
7:2>H/W under test = /SYS/MB/CMP0/BR2/CH0/D0
7:2>Repair Instructions: Replace items in order listed by 'H/W
under test' above.
7:2>MSG = Pin 149 failed on /SYS/MB/CMP0/BR2/CH0/D0 (J2001)
7:2>END_ERROR

7:2>Decode of Dram Error Log Reg Channel 2 bits
60000000.0000108c
7:2> 1 MEC 62 R/W1C Multiple corrected
errors, one or more CE not logged
7:2> 1 DAC 61 R/W1C Set to 1 if the error
was a DRAM access CE
7:2> 108c SYND 15:0 RW ECC syndrome.
7:2>
7:2> Dram Error AFAR channel 2 = 00000000.00000000
7:2> L2 AFAR channel 2 = 00000000.00000000
```

b. Run the `showfaults` command to obtain additional fault information.

The fault is captured by ALOM CMT, where the fault is logged, the Service Required LED is lit, and the faulty component is disabled.

Example:

CODE EXAMPLE 2-7 `showfaults` Output

```
ok .#
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
ID FRU                      Fault
0 /SYS/MB/CMP0/BR2/CH0/D0 SP detected fault: /SYS/MB/CMP0/BR2/CH0/D0
Forced fail (POST)
```

In this example, /SYS/MB/CMP0/BR2/CH0/D0 is disabled. The system can boot using memory that was not disabled until the faulty component is replaced.

Note – You can use ASR commands to display and control disabled components. See Section 2.7, "Managing Components With Automatic System Recovery Commands" on page 2-38.

2.4.5 Clearing POST Detected Faults

In most cases, when POST detects a faulty component, POST logs the fault and automatically takes the failed component out of operation by placing the component in the ASR blacklist (see Section 2.7, "Managing Components With Automatic System Recovery Commands" on page 2-38).

In most cases, the replacement of the faulty FRU is detected when the service processor is reset or power cycled. In this case, the fault is automatically cleared from the system. This procedure describes how to do this and, if necessary, manually clear the fault.

1. **After replacing a faulty FRU, at the ALOM CMT prompt use the `showfaults` command to identify POST detected faults.**

   POST detected faults are distinguished from other kinds of faults by the text: `Forced fail`, and no UUID number is reported.

   Example:

CODE EXAMPLE 2-8 POST Detected Fault

```
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
ID FRU                     Fault
0 /SYS/MB/CMP0/BR2/CH0/D0 SP detected fault: /SYS/MB/CMP0/BR2/CH0/D0
Forced fail (POST)
```

   If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.

2. **Use the `enablecomponent` command to clear the fault and remove the component from the ASR blacklist.**

   Use the FRU name that was reported in the fault in Step 1.:

CODE EXAMPLE 2-9 Using the `enablecomponent` Command

```
sc> enablecomponent /SYS/MB/CMP0/BR2/CH0/D0
```

   The fault is cleared and should not show up when you run the `showfaults` command. Additionally, the Service Required LED is no longer on.

3. **Power cycle the server.**

   You must reboot the server for the `enablecomponent` command to take effect.

4. **At the ALOM CMT prompt, use the `showfaults` command to verify that no faults are reported.**

TABLE 2-6 Verifying Cleared Faults Using the `showfaults` Command

```
sc> showfaults
Last POST run: THU MAR 09 16:52:44 2006
POST status: Passed all devices

No failures found in System
```

2.5 Using the Solaris Predictive Self-Healing Feature

The Solaris Predictive Self-Healing (PSH) technology enables the server to diagnose problems while the Solaris OS is running, and mitigate many problems before they negatively affect operations.

The Solaris OS uses the fault manager daemon, `fmd(1M)`, which starts at boot time and runs in the background to monitor the system. If a component generates an error, the daemon handles the error by correlating the error with data from previous errors and other related information to diagnose the problem. Once diagnosed, the fault manager daemon assigns the problem a Universal Unique Identifier (UUID) that distinguishes the problem across any set of systems. When possible, the fault manager daemon initiates steps to self-heal the failed component and take the component offline. The daemon also logs the fault to the `syslogd` daemon and provides a fault notification with a message ID (MSGID). You can use the message ID to get additional information about the problem from Sun's knowledge article database.

The Predictive Self-Healing technology covers the following server components:

- UltraSPARC T2 multicore processor
- Memory
- I/O bus

The PSH console message provides the following information:

- Type
- Severity
- Description
- Automated response
- Impact
- Suggested action for system administrator

If the Solaris PSH facility detects a faulty component, use the `fmdump` command to identify the fault. Faulty FRUs are identified in fault messages using the FRU name. For a list of FRU names, see Appendix A.

Note – Additional Predictive Self-Healing information is available at:
`http://www.sun.com/msg`

2.5.1 Identifying PSH Detected Faults

When a PSH fault is detected, a Solaris console message similar to CODE EXAMPLE 2-10 is displayed.

CODE EXAMPLE 2-10 Console Message Showing Fault Detected by PSH

```
SUNW-MSG-ID: SUN4V-8000-DX, TYPE: Fault, VER: 1, SEVERITY: Minor
EVENT-TIME: Wed Sep 14 10:09:46 EDT 2005
PLATFORM: SUNW,Sun-Fire-T200, CSN: -, HOSTNAME: wgs48-37
SOURCE: cpumem-diagnosis, REV: 1.5
EVENT-ID: f92e9fbe-735e-c218-cf87-9e1720a28004
DESC: The number of errors associated with this memory module has exceeded
acceptable levels.  Refer to http://sun.com/msg/SUN4V-8000-DX for more
information.
AUTO-RESPONSE: Pages of memory associated with this memory module are being
removed from service as errors are reported.
IMPACT: Total system memory capacity will be reduced as pages are retired.
REC-ACTION: Schedule a repair procedure to replace the affected memory module.
Use fmdump -v -u <EVENT_ID> to identify the module.
```

Faults detected by the Solaris PSH facility are also reported through service processor alerts. CODE EXAMPLE 2-11 depicts an ALOM CMT alert of the same fault reported by Solaris PSH in CODE EXAMPLE 2-10.:

CODE EXAMPLE 2-11 ALOM CMT Alert of PSH Diagnosed Fault

```
SC Alert: Host detected fault, MSGID: SUN4V-8000-DX
```

The ALOM CMT `showfaults` command provides summary information about the fault. See Section 2.3.4, "Running the `showfaults` Command" on page 2-17 for more information about the `showfaults` command.

Note – The Service Required LED is also turns on for PSH diagnosed faults.

2.5.1.1 Using the `fmdump` Command to Identify Faults

The `fmdump` command displays the list of faults detected by the Solaris PSH facility and identifies the faulty FRU for a particular EVENT_ID (UUID).

Do not use `fmdump` to verify a FRU replacement has cleared a fault because the output of `fmdump` is the same after the FRU has been replaced. Use the `fmadm faulty` command to verify the fault has cleared.

1. **Check the event log using the `fmdump` command with `-v` for verbose output:**

CODE EXAMPLE 2-12 Output from the `fmdump -v` Command

```
# fmdump -v -u fd940ac2-d21e-c94a-f258-f8a9bb69d05b
TIME                 UUID                                 SUNW-MSG-ID
Jul 31 12:47:42.2007 fd940ac2-d21e-c94a-f258-f8a9bb69d05b SUN4V-8000-JA
  100%  fault.cpu.ultraSPARC-T2.misc_regs

        Problem in: cpu:///cpuid=16/serial=5D67334847
           Affects: cpu:///cpuid=16/serial=5D67334847
               FRU: hc://:serial=101083:part=541215101/motherboard=0
          Location: MB
```

In CODE EXAMPLE 2-12, a fault is displayed, indicating the following details:

- Date and time of the fault (`Jul 31 12:47:42.2007`)
- Universal Unique Identifier (UUID). This is unique for every fault (`fd940ac2-d21e-c94a-f258-f8a9bb69d05b`)
- Sun message identifier, which can be used to obtain additional fault information (`SUN4V-8000-JA`)
- Faulted FRU. The information provided in the example includes the part number of the FRU (`part=541215101`) and the serial number of the FRU (`serial=101083`). The `Location` field provides the name of the FRU. In CODE EXAMPLE 2-12 the FRU name is `MB`, meaning the motherboard.

Note – `fmdump` displays the PSH event log. Entries remain in the log after the fault has been repaired.

---

2. **Use the Sun message ID to obtain more information about this type of fault.**

   a. **In a browser, go to the Predictive Self-Healing Knowledge Article web site:** `http://www.sun.com/msg`

   b. Obtain the message ID from the console output or the ALOM CMT `showfaults` command.

c. **Enter the message ID in the SUNW-MSG-ID field, and click Lookup.**

In CODE EXAMPLE 2-13, the message ID SUN4V-8000-JA provides information for corrective action:

CODE EXAMPLE 2-13 PSH Message Output

```
CPU errors exceeded acceptable levels

Type
    Fault
Severity
    Major
Description
    The number of errors associated with this CPU has exceeded
acceptable levels.
Automated Response
   The fault manager will attempt to remove the affected CPU from
service.
Impact
    System performance may be affected.

Suggested Action for System Administrator
    Schedule a repair procedure to replace the affected CPU, the
identity of which can be determined using fmdump -v -u <EVENT_ID>.

Details
    The Message ID:  SUN4V-8000-JA indicates diagnosis has
determined that a CPU is faulty. The Solaris fault manager arranged
an automated attempt to disable this CPU. The recommended action
for the system administrator is to contact Sun support so a Sun
service technician can replace the affected component.
```

3. **Follow the suggested actions to repair the fault.**

2.5.2 Clearing PSH Detected Faults

When the Solaris PSH facility detects faults the faults are logged and displayed on the console. In most cases, after the fault is repaired, the corrected state is detected by the system and the fault condition is repaired automatically. However, this must be verified and, in cases where the fault condition is not automatically cleared, the fault must be cleared manually.

1. **After replacing a faulty FRU, power on the server.**

2. **At the ALOM CMT prompt, use the `showfaults` command to identify PSH detected faults.**

   PSH detected faults are distinguished from other kinds of faults by the text: `Host detected fault`.

   Example:

```
sc> showfaults -v
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
ID  Time              FRU                        Fault
0  Jun 30 22:13:02   /SYS/MB/CMP0/BR2/CH0/D0  Host detected fault,
MSGID: SUN4V-8000-DX  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

- If no fault is reported, you do not need to do anything else. Do not perform the subsequent steps.
- If a fault is reported, perform Step 3 and Step 4.

3. **Run the ALOM CMT `clearfault` command with the UUID provided in the `showfaults` output.**

   Example:

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
Clearing fault from all indicted FRUs...
Fault cleared.
```

4. **Clear the fault from all persistent fault records.**

   In some cases, even though the fault is cleared, some persistent fault information remains and results in erroneous fault messages at boot time. To ensure that these messages are not displayed, perform the following Solaris command:

   `fmadm repair` *UUID*

   Example:

```
# fmadm repair 7ee0e46b-ea64-6565-e684-e996963f7b86
```

2.6 Collecting Information From Solaris OS Files and Commands

With the Solaris OS running on the server, you have the full complement of Solaris OS files and commands available for collecting information and for troubleshooting.

If POST, ALOM CMT, or the Solaris PSH features do not indicate the source of a fault, check the message buffer and log files for notifications for faults. Hard drive faults are usually captured by the Solaris message files.

Use the `dmesg` command to view the most recent system message. To view the system messages log file, view the contents of the `/var/adm/messages` file.

2.6.1 Checking the Message Buffer

1. **Log in as superuser.**
2. **Issue the `dmesg` command:**

```
# dmesg
```

The `dmesg` command displays the most recent messages generated by the system.

2.6.2 Viewing System Message Log Files

The error logging daemon, `syslogd`, automatically records various system warnings, errors, and faults in message files. These messages can alert you to system problems such as a device that is about to fail.

The `/var/adm` directory contains several message files. The most recent messages are in the `/var/adm/messages` file. After a period of time (usually every ten days), a new `messages` file is automatically created. The original contents of the `messages` file are rotated to a file named `messages.1`. Over a period of time, the messages are further rotated to `messages.2` and `messages.3`, and then deleted.

1. **Log in as superuser.**

2. **Issue the following command:**

```
# more /var/adm/messages
```

3. **If you want to view all logged messages, issue the following command:**

```
# more /var/adm/messages*
```

2.7 Managing Components With Automatic System Recovery Commands

The Automatic System Recovery (ASR) feature enables the server to automatically configure failed components out of operation until they can be replaced. In the server, the following components are managed by the ASR feature:

- UltraSPARC T2 processor strands
- Memory FB-DIMMs
- I/O bus

The database that contains the list of disabled components is called the ASR blacklist (`asr-db`).

In most cases, POST automatically disables a faulty component. After the cause of the fault is repaired (FRU replacement, loose connector reseated, and so on), you must remove the component from the ASR blacklist.

The ASR commands (TABLE 2-7) enable you to view, and manually add or remove components from the ASR blacklist. You run these commands from the ALOM CMT `sc>` prompt.

TABLE 2-7 ASR Commands

Command	Description
`showcomponent`	Displays system components and their current state.
`enablecomponent` *asrkey*	Removes a component from the `asr-db` blacklist, where *asrkey* is the component to enable.
`disablecomponent` *asrkey*	Adds a component to the `asr-db` blacklist, where *asrkey* is the component to disable.
`clearasrdb`	Removes all entries from the `asr-db` blacklist.

Note – The components (*asrkeys)* vary from system to system, depending on how many cores and memory are present. Use the `showcomponent` command to see the `asrkeys` on a given system.

Note – A reset or powercycle is required after disabling or enabling a component. If the status of a component is changed, there is no effect to the system until the next reset or power cycle.

2.7.1 Displaying System Components

The `showcomponent` command displays the system components (`asrkeys`) and reports their status.

- **At the `sc>` prompt, enter the `showcomponent` command**

  CODE EXAMPLE 2-14 shows partial output with no disabled components.

CODE EXAMPLE 2-14 Output of the showcomponent Command with No Disabled Components

```
sc> showcomponent
Keys:

    /SYS/MB/RISER0/XAUI0
    /SYS/MB/RISER0/PCIE0
    /SYS/MB/RISER0/PCIE3
    /SYS/MB/RISER1/XAUI1
    /SYS/MB/RISER1/PCIE1
    /SYS/MB/RISER1/PCIE4
    /SYS/MB/RISER2/PCIE2
    /SYS/MB/RISER2/PCIE5
    /SYS/MB/GBE0
    /SYS/MB/GBE1
    /SYS/MB/PCIE
    /SYS/MB/PCIE-IO/USB
    /SYS/MB/SASHBA
    /SYS/MB/CMP0/NIU0
    /SYS/MB/CMP0/NIU1
    /SYS/MB/CMP0/MCU0
    /SYS/MB/CMP0/MCU1
    /SYS/MB/CMP0/MCU2
    /SYS/MB/CMP0/MCU3
```

CODE EXAMPLE 2-14 Output of the showcomponent Command with No Disabled Components *(Continued)*

```
    /SYS/MB/CMP0/L2_BANK0
    /SYS/MB/CMP0/L2_BANK1
    /SYS/MB/CMP0/L2_BANK2
    /SYS/MB/CMP0/L2_BANK3
    /SYS/MB/CMP0/L2_BANK4
    /SYS/MB/CMP0/L2_BANK5
    /SYS/MB/CMP0/L2_BANK6
    /SYS/MB/CMP0/L2_BANK7
    ...
    /SYS/TTYA
State: Clean
```

CODE EXAMPLE 2-15 shows `showcomponent` command output with a component disabled:

CODE EXAMPLE 2-15 Output of the showcomponent Command Showing Disabled Components

```
sc> showcomponent
Keys:

    /SYS/MB/RISER0/XAUI0
    /SYS/MB/RISER0/PCIE0
    /SYS/MB/RISER0/PCIE3
    /SYS/MB/RISER1/XAUI1
    /SYS/MB/RISER1/PCIE1
    /SYS/MB/RISER1/PCIE4
    /SYS/MB/RISER2/PCIE2
    /SYS/MB/RISER2/PCIE5
    ...
    /SYS/TTYA
Disabled Devices
  /SYS/MB/CMP0/L2_BANK0Disabled by user
```

2.7.2 Disabling Components

The `disablecomponent` command disables a component by adding it to the ASR blacklist.

1. **At the** `sc>` **prompt, enter the** `disablecomponent` **command.**

```
sc> disablecomponent /SYS/MB/CMP0/BR1/CH0/D0
Chassis | major: /SYS/MB/CMP0/BR1/CH0/D0 has been disabled.
Disabled by user
```

2. **After receiving confirmation that the `disablecomponent` command is complete, reset the server so that the ASR command takes effect.**

```
sc> reset
```

2.7.3 Enabling Disabled Components

The `enablecomponent` command enables a disabled component by removing it from the ASR blacklist.

1. **At the `sc>` prompt, enter the `enablecomponent` command.**

```
sc> enablecomponent /SYS/MB/CMP0/BR1/CH0/D0
Chassis | major: /SYS/MB/CMP0/BR1/CH0/D0 has been enabled.
```

2. **After receiving confirmation that the `enablecomponent` command is complete, reset the server for so that the ASR command takes effect.**

```
sc> reset
```

2.8 Exercising the System With SunVTS

Sometimes a server exhibits a problem that cannot be isolated definitively to a particular hardware or software component. In such cases, it might be useful to run a diagnostic tool that stresses the system by continuously running a comprehensive battery of tests. Sun provides the SunVTS software for this purpose.

This chapter describes the tasks necessary to use SunVTS software to exercise your server:

- Section 2.8.1, "Checking Whether SunVTS Software Is Installed" on page 2-41
- Section 2.8.2, "Exercising the System Using SunVTS Software" on page 2-42

2.8.1 Checking Whether SunVTS Software Is Installed

This procedure assumes that the Solaris OS is running on the server, and that you have access to the Solaris command line.

1. **Check for the presence of SunVTS packages using the `pkginfo` command.**

```
% pkginfo -l SUNWvts SUNWvtsr SUNWvtsts SUNWvtsmn
```

TABLE 2-8 lists SunVTS packages:

TABLE 2-8 SunVTS Packages

Package	Description
SUNWvts	SunVTS framework
SUNWvtsr	SunVTS framework (root)
SUNWvtsts	SunVTS for tests
SUNWvtsmn	SunVTS man pages

- If SunVTS software is installed, information about the packages is displayed.
- If SunVTS software is not installed, you see an error message for each missing package, as in CODE EXAMPLE 2-16

CODE EXAMPLE 2-16 Missing Package Errors for SunVTS

```
ERROR: information for "SUNWvts" was not found
ERROR: information for "SUNWvtsr" was not found
...
```

If SunVTS is not installed, you can obtain the installation packages from the following places:

- Solaris Operating System DVDs
- From the Sun Download Center: `http://www.sun.com/oem/products/vts`

The SunVTS 6.0 PS3 software, and future compatible versions, are supported on the server.

SunVTS installation instructions are described in the *SunVTS User's Guide*.

2.8.2 Exercising the System Using SunVTS Software

Before you begin, the Solaris OS must be running. You also need to ensure that SunVTS validation test software is installed on your system. See Section 2.8.1, "Checking Whether SunVTS Software Is Installed" on page 2-41.

The SunVTS installation process requires that you specify one of two security schemes to use when running SunVTS. The security scheme you choose must be properly configured in the Solaris OS for you to run SunVTS. For details, refer to the *SunVTS User's Guide*.

SunVTS software features both character-based and graphics-based interfaces. This procedure assumes that you are using the graphical user interface (GUI) on a system running the Common Desktop Environment (CDE). For more information about the character-based SunVTS TTY interface, and specifically for instructions on accessing it by `tip` or `telnet` commands, refer to the *SunVTS User's Guide.*

SunVTS software can be run in several modes. This procedure assumes that you are using the default mode.

This procedure also assumes that the server is *headless*. That is, it is not equipped with a monitor capable of displaying bitmap graphics. In this case, you access the SunVTS GUI by logging in remotely from a machine that has a graphics display.

Finally, this procedure describes how to run SunVTS tests in general. Individual tests might presume the presence of specific hardware, or might require specific drivers, cables, or loopback connectors. For information about test options and prerequisites, refer to the following documentation:

- *SunVTS 6.3 Test Reference Manual for SPARC Platforms*
- *SunVTS 6.3 User's Guide*

2.8.3 Exercising the System With SunVTS Software

1. **Log in as superuser to a system with a graphics display.**

   The display system should be one with a frame buffer and monitor capable of displaying bitmap graphics such as those produced by the SunVTS GUI.

2. **Enable the remote display.**

   On the display system, type:

```
# /usr/openwin/bin/xhost + test-system
```

   where *test-system* is the name of the server you plan to test.

3. **Remotely log in to the server as superuser.**

   Use a command such as `rlogin` or `telnet`.

4. **Start** SunVTS **software.**

   If you have installed SunVTS software in a location other than the default `/opt` directory, alter the path, as in CODE EXAMPLE 2-17.

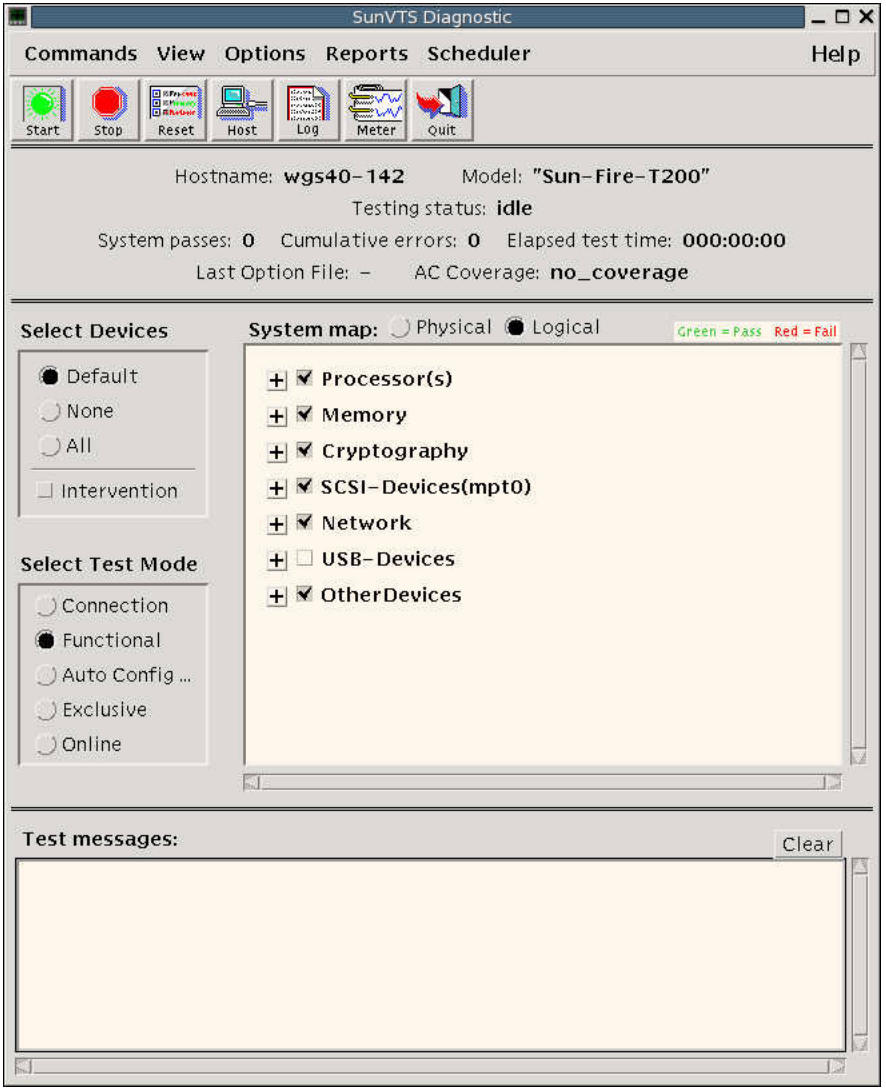
CODE EXAMPLE 2-17 Alternate Command for Starting SunVTS Software

```
# /opt/SUNWvts/bin/sunvts -display display-system:0
```

   where *display-system* is the name of the machine through which you are remotely logged in to the server.

   The SunVTS GUI is displayed (FIGURE 2-4).

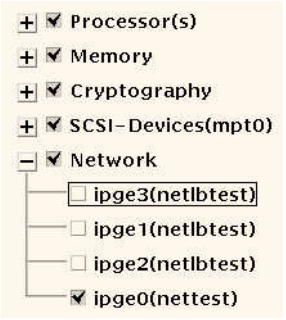
FIGURE 2-4 SunVTS GUI



5. **Expand the test lists to see the individual tests.**

   The test selection area lists tests in categories, such as *Network*, as shown in FIGURE 2-5. To expand a category, left-click the ⊞ icon (expand category icon) to the left of the category name.

FIGURE 2-5 SunVTS Test Selection Panel



6. **(Optional) Select the tests you want to run.**

   Certain tests are enabled by default, and you can choose to accept these.

   Alternatively, you can enable and disable individual tests or blocks of tests by clicking the checkbox next to the test name or test category name. Tests are enabled when checked, and disabled when not checked.

   TABLE 2-9 lists tests that are especially useful to run on this server.

TABLE 2-9 Useful SunVTS Tests to Run on This Server

SunVTS Tests	FRUs Exercised by Tests
`cmttest`, `cputest`, `fputest`, `iutest`, `l1dcachetest`, `dtlbtest`, and `l2sramtest`—*indirectly*: `mptest`, and `systest`	DIMMS, CPU motherboard
`disktest`	Disks, cables, disk backplane
`cddvdtest`	CD/DVD device, cable, motherboard
`nettest`, `netlbtest`	Network interface, network cable, CPU motherboard
`pmemtest`, `vmemtest`, `ramtest`	DIMMs, motherboard
`serialtest`	I/O (serial port interface)
`usbkbtest`, `disktest`	USB devices, cable, CPU motherboard (USB controller)
`hsclbtest`	Motherboard, service processor (Host to service processor interface)

7. **(Optional) Customize individual tests.**

   You can customize individual tests by right-clicking on the name of the test. For example, in FIGURE 2-5, right-clicking on the text string `ce0(nettest)` brings up a menu that enables you to configure this Ethernet test.

8. **Start testing.**

   Click the Start button that is located at the top left of the SunVTS window. Status and error messages appear in the test messages area located across the bottom of the window. You can stop testing at any time by clicking the Stop button.

During testing, SunVTS software logs all status and error messages. To view these messages, click the Log button or select Log Files from the Reports menu. This action opens a log window from which you can choose to view the following logs:

- **Information** – Detailed versions of all the status and error messages that appear in the test messages area.
- **Test Error** – Detailed error messages from individual tests.
- **VTS Kernel Error** – Error messages pertaining to SunVTS software itself. Look here if SunVTS software appears to be acting strangely, especially when it starts up.
- **Solaris OS Message**s (`/var/adm/messages`) – A file containing messages generated by the operating system and various applications.
- **Log Files** (`/var/opt/SUNWvts/logs`) – A directory containing the log files.

CHAPTER 3

Preparing to Service the System

This chapter describes how to prepare the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 for servicing.

The following topics are covered:

- Section 3.1, "Safety Information" on page 3-1
- Section 3.2, "Required Tools" on page 3-3
- Section 3.4, "Powering Off the Server" on page 3-4
- Section 3.5, "Disconnecting Power Cords from the Server" on page 3-6
- Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6
- Section 3.7, "Removing a Server From the Rack" on page 3-8
- Section 3.8, "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 3-11
- Section 3.9, "Removing the Top Cover" on page 3-12

Note – Never attempt to run the server with the covers removed. Hazardous voltage present.

Caution – Equipment damage possible. The covers must be in place for proper air flow.

3.1 Safety Information

This section describes important safety information that you need to know prior to removing or installing parts in the Sun SPARC Enterprise T5120 and T5220 servers.

For your protection, observe the following safety precautions when setting up your equipment:

- Follow all Sun cautions, warnings, and instructions marked on the equipment and described in *Important Safety Information for Sun Hardware Systems* (816-7190).
- Follow all cautions, warnings, and instructions marked on the equipment and described in the *Sun SPARC Enterprise T5120 and 5220 Servers Compliance and Safety Manual*.
- Ensure that the voltage and frequency of your power source match the voltage and frequency inscribed on the equipment's electrical rating label.
- Follow the electrostatic discharge safety practices as described in this section.

3.1.1 Safety Symbols

Note the meanings of the following symbols that might appear in this document:

Caution – There is a risk of personal injury and or equipment damage. To avoid personal injury and equipment damage, follow the instructions.

Caution – Hot surface. Avoid contact. Surfaces are hot and might cause personal injury if touched.

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

3.1.2 Electrostatic Discharge Safety Measures

Electrostatic discharge (ESD) sensitive devices, such as the motherboards, PCI cards, hard drives, and memory cards require special handling.

Caution – Circuit boards and hard drives contain electronic components that are extremely sensitive to static electricity. Ordinary amounts of static electricity from clothing or the work environment can destroy the components located on these boards. Do not touch the components along their connector edges.

Caution – You must disconnect both power supplies before servicing any of the components documented in this chapter.

3.1.2.1 Using an Antistatic Wrist Strap

Wear an antistatic wrist strap and use an antistatic mat when handling components such as hard drive assemblies, circuit boards, or PCI cards. When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis. Following this practice equalizes the electrical potentials between you and the server.

Note – An antistatic wrist strap is no longer included in the accessory kit for the Sun SPARC Enterprise T5120 and T5220 servers. However, antistatic wrist straps are still included with options.

3.1.2.2 Using an Antistatic Mat

Place ESD-sensitive components such as motherboards, memory, and other PCBs on an antistatic mat.

3.2 Required Tools

The Sun SPARC Enterprise T5120 and T5220 servers can be serviced with the following tools:

- Antistatic wrist strap
- Antistatic mat
- No. 2 Phillips screwdriver
- No. 1 Flat-blade screwdriver (battery removal)
- Pen or pencil (power on server)

3.3 Obtaining the Chassis Serial Number

To obtain support for your system, you need your chassis serial number. The chassis serial number is located on a sticker that is on the front of the server and another sticker on the side of the server. You can also run the ALOM CMT `showplatform` command to obtain the chassis serial number.

```
sc> showplatform
SUNW,Sun-Fire-T5220
Chassis Serial Number: 0529AP000882
Domain Status
------ ------
S0 OS Standby
sc>
```

3.4 Powering Off the Server

3.4.1 Powering Off the Server – Service Processor Command Line

---

Note – Additional information about powering on the server is located in the *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide*.

You can use the service processor to perform a graceful shutdown of the server and ensure that all of your data is saved and the server is ready for restart.

1. **Login as superuser or equivalent.**

   Depending on the type of problem, you might want to view server status, log files, or run diagnostics before you shut down the server. Refer to the *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide* for log file information.

2. **Notify affected users.**

   Refer to your Solaris system administration documentation for additional information.

3. **Save any open files and quit all running programs.**

   Refer to your application documentation for specific information on these processes.

4. **Shut down all logical domains.**

   Refer to the Solaris system administration documentation for additional information.

5. **Shut down the Solaris OS.**

   Refer to the Solaris system administration documentation for additional information.

6. **Switch from the system console to the `->` prompt by typing the `#.` (pound period) key sequence.**

   d. At the `sc>` prompt, issue the `poweroff -fy` command.

```
sc> poweroff -fy
SC Alert: SC Request to Power Off Host Immediately.
```

Note – You can also use the Power button on the front of the server to initiate a graceful server shutdown (See Section 3.4.2, "Powering Off the Server – Graceful Shutdown" on page 3-5). This button is recessed to prevent accidental server power-off. Use the tip of a pen to operate this button.

Refer to the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for more information about the `poweroff` command.

3.4.2 Powering Off the Server – Graceful Shutdown

- **Press and release the Power button.**

  If necessary, use a pen or pencil to press the Power button.

3.4.3 Powering Off the Server – Emergency Shutdown

Caution – All applications and files will be closed abruptly without saving changes. File system corruption might occur.

- **Press and hold the Power button for 4 seconds.**

3.5 Disconnecting Power Cords from the Server

- **Unplug all power cords from the server.**

Caution – Because 3.3v standby power is always present in the system, you must unplug the power cords before accessing any cold-serviceable components.

3.6 Extending the Server to the Maintenance Position

The following components can be serviced with the server in the maintenance position:

- Hard drives
- Fan modules
- Power supplies
- DVD/USB module
- Fan power boards
- FB-DIMMs
- PCIe/XAUI cards
- Motherboard battery
- SCC module

If the server is installed in a rack with extendable slide rails, use this procedure to extend the server to the maintenance position.

1. **(Optional) Issue the `setlocator` command from the `sc>` prompt to locate the system that requires maintenance.**

```
sc> setlocator on
Locator indicator is on.
```

   Once you have located the server, press the Locator LED/Locator button to turn it off.

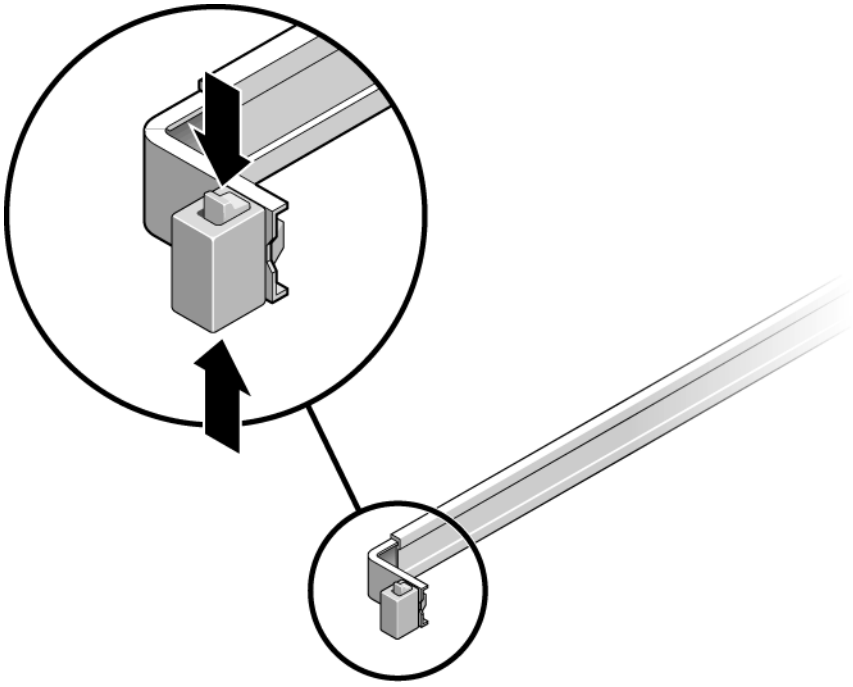
2. **Verify that no cables will be damaged or will interfere when the server is extended.**

   Although the cable management arm (CMA) that is supplied with the server is hinged to accommodate extending the server, you should ensure that all cables and cords are capable of extending.

3. **From the front of the server, release the two slide release latches (**FIGURE 3-1**).**

   Squeeze the green slide release latches to release the slide rails.

FIGURE 3-1 Slide Release Latches



4. **While squeezing the slide release latches, slowly pull the server forward until the slide rails lock into the maintenance position.**

3.7 Removing a Server From the Rack

The server must be removed from the rack to remove or install the following components:

- Motherboard
- Power distribution board
- Power supply backplane (Sun SPARC Enterprise T5220 server)
- Paddle card
- Disk cage
- Hard drive backplane
- Front panel light-pipe assemblies

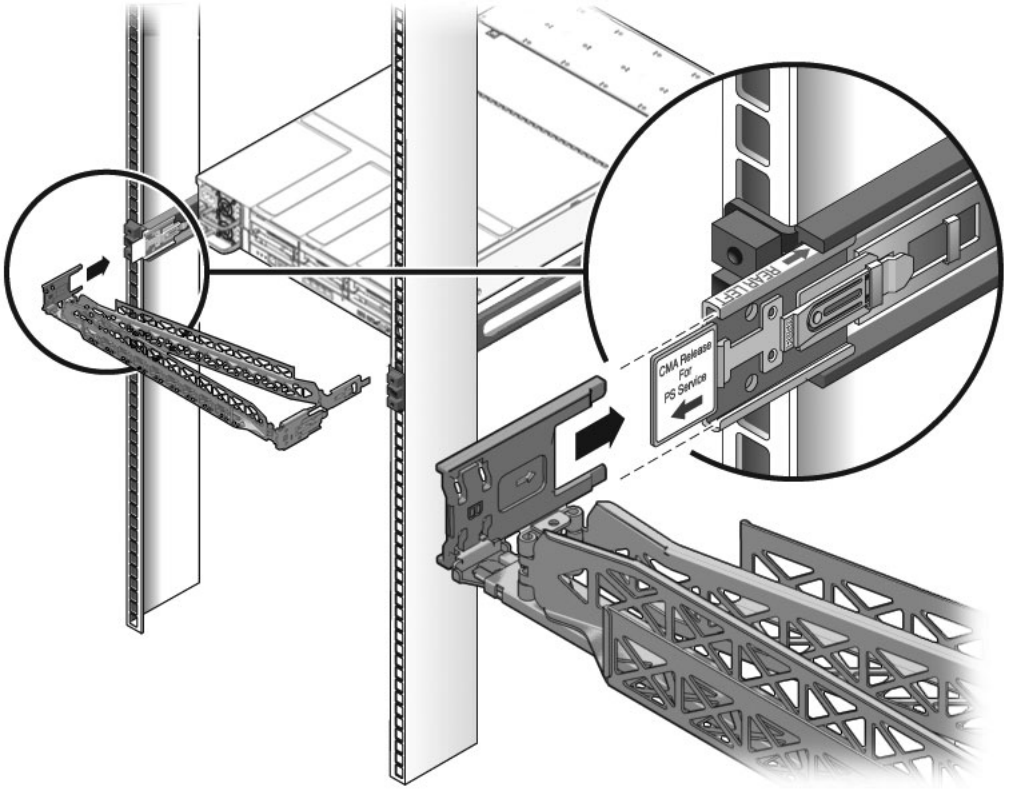
Caution – If necessary, use two people to dismount and carry the chassis.

1. **Disconnect all the cables and power cords from the server.**
2. **Extend the server to the maintenance position.**

   See Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6.
3. **Press the metal lever that is located on the inner side of the rail to disconnect the cable management arm (CMA) from the rail assembly (**FIGURE 3-2**).**

   The CMA is still attached to the cabinet, but the server chassis is now disconnected from the CMA.

FIGURE 3-2 Metal Lever and Cable Management Arm

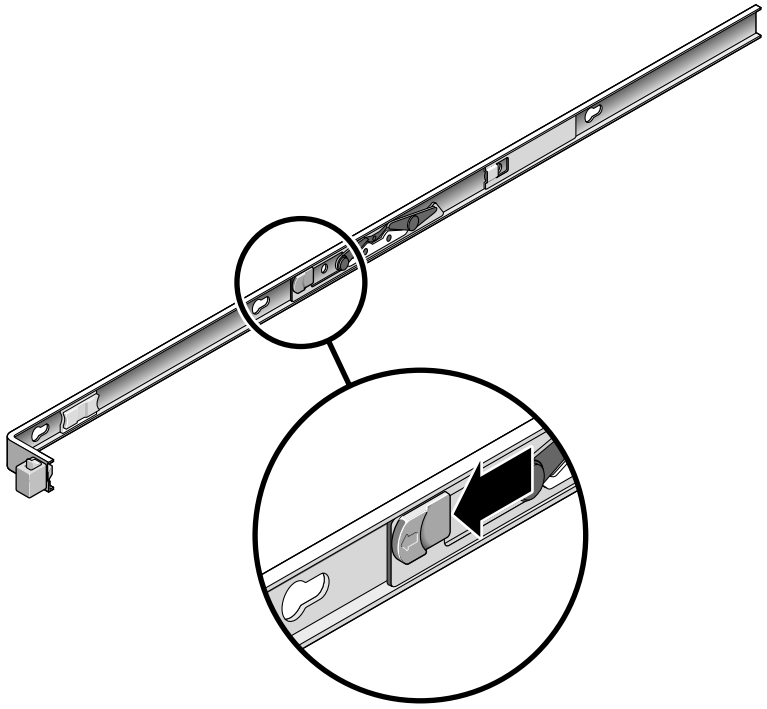


Caution – If necessary, use two people to dismount and carry the chassis.

4. **From the front of the server, pull the release tabs forward and pull the server forward until it is free of the rack rails (**FIGURE 3-3**).**

   A release tab is located on each rail.

FIGURE 3-3 Release Tabs and Slide Assembly



5. **Set the server on a sturdy work surface.**

3.8 Performing Electrostatic Discharge – Antistatic Prevention Measures

1. **Prepare an antistatic surface to set parts on during the removal, installation, or replacement process.**

   Place ESD-sensitive components such as the printed circuit boards on an antistatic mat. The following items can be used as an antistatic mat:

   - Antistatic bag used to wrap a Sun replacement part
   - Sun ESD mat, part number 250-1088
   - A disposable ESD mat (shipped with some replacement parts or optional system components)

2. **Attach an antistatic wrist strap.**

   When servicing or removing server components, attach an antistatic strap to your wrist and then to a metal area on the chassis.

3.9 Removing the Top Cover

1. **Unlatch the fan module door.**

   Pull the release tabs back to release the door. Slide the top cover toward the rear of the server.

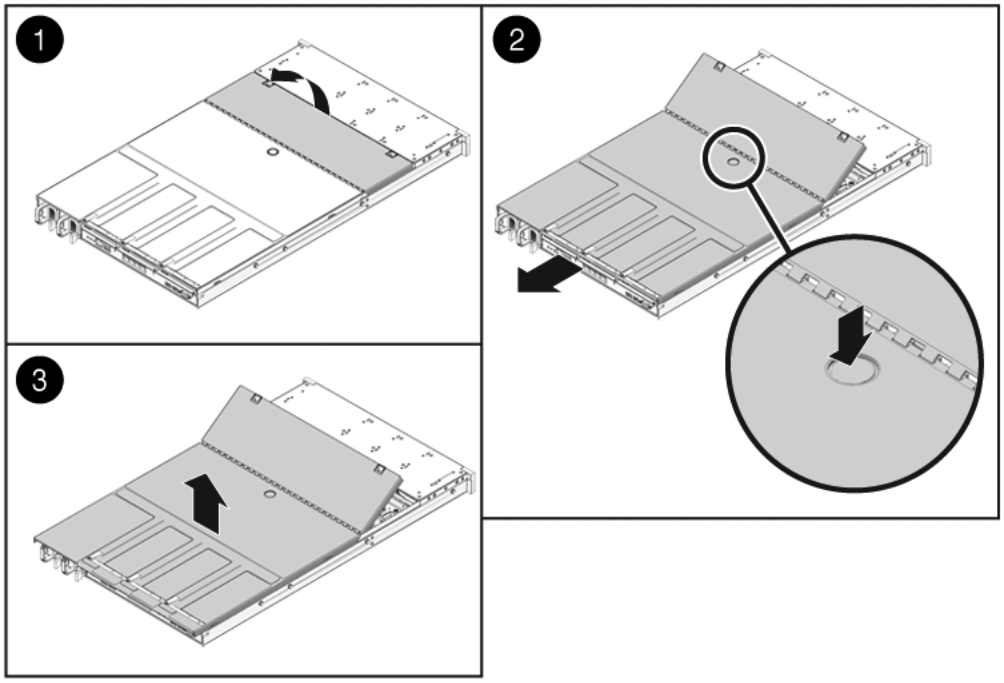
2. **Press the top cover release button and slide the top cover to the rear about a 0.5 inch (12.7 mm).**

3. **Remove the top cover.**

   Lift up and remove the cover.

Caution – If the top cover is removed before the server is powered off, the server will immediately disable the front panel Power button and shut down. After such an event, you must replace the top cover and use the `poweron` command to power on the server. See Section 7.5, "Powering On the Server" on page 7-5.

FIGURE 3-4 Removing the Top Cover (Sun SPARC Enterprise T5120 server shown; Sun SPARC Enterprise T5220 server is similar.)



CHAPTER 4

Replacing Hot-Pluggable and Hot-Swappable Components

This chapter describes how to replace the hot-swappable and hot-pluggable components in the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers.

The following topics are covered:

- Section 4.1, "Devices That are Hot-Pluggable or Hot-Swappable" on page 4-1
- Section 4.2, "About the Hard Drives" on page 4-2
- Section 4.3, "About the Fan Modules" on page 4-4
- Section 4.4, "About the Power Supplies" on page 4-5
- Section 4.5, "Hot-Plugging a Hard Drive" on page 4-7
- Section 4.6, "Hot-Swapping a Fan Module" on page 4-13
- Section 4.7, "Hot-Swapping a Power Supply" on page 4-16
- Section 4.8, "Reference for Hard Drive Configuration" on page 4-21
- Section 4.9, "Reference for Fan Module Configuration" on page 4-23
- Section 4.10, "Reference For Power Supply Configuration" on page 4-24

4.1 Devices That are Hot-Pluggable or Hot-Swappable

Hot-pluggable devices are those devices that you can remove and install while the server is running, but you must perform administrative tasks before or after installing the hardware (for example, mounting a hard drive). In the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers, the following devices are hot-pluggable:

- Hard drives

Hot-swappable devices are those devices that can be removed and installed while the server is running without affecting the rest of the server's capabilities. In the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers the following devices are hot-swappable:

- Fan modules
- Power supplies

Note – The chassis-mounted hard drives can be hot-swappable, depending on how they are configured.

4.2 About the Hard Drives

The hard drives in the server are hot-pluggable, but this capability depends on how the hard drives are configured. To hot-plug a drive you must take the drive offline (to prevent any applications from accessing it, and to remove the logical software links to it) before you can safely remove it.

Caution – You must use hard drives designed for this server, which have a vented front panel to allow adequate airflow to internal system components. Installing inappropriate hard drives could result in an overtemperature condition.

The following situations inhibit your ability to hot-plug a drive:

- If the hard drive contains the operating system, and the operating system is not mirrored on another drive.
- If the hard drive cannot be logically isolated from the online operations of the server.

If your drive falls into one of these conditions, you must power off the server before you replace the hard drive. See the following:

- Section 4.2.2, "Powering Off the Server – Service Processor Command Line" on page 4-4
- Section 4.2.3, "Powering Off the Server – Graceful Shutdown" on page 4-5
- Section 4.2.4, "Powering Off the Server – Emergency Shutdown" on page 4-5.

For specific drive locations, see the following:

- Section 4.8.1, "Sun SPARC Enterprise T5120 Server Hard Drive Locations" on page 4-21.
- Section 4.8.2, "Sun SPARC Enterprise T5220 Server Hard Drive Locations" on page 4-22

4.2.1 Hard Drive LEDs

FIGURE 4-1 Hard Drive LEDs

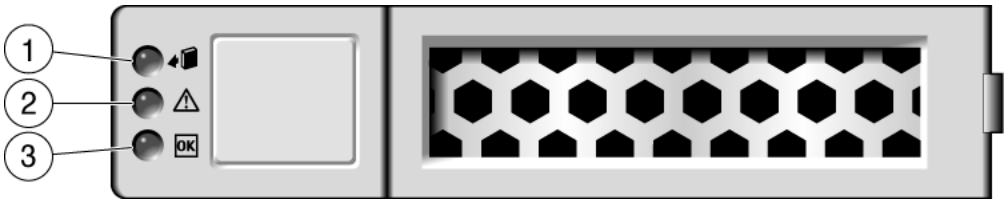


TABLE 4-1 Hard Drive Status LEDs

Figure	LED		Color	Notes
1	Ready to Remove		Blue	This LED is lit to indicate that a hard drive can be removed safely during a hot-plug operation.
2	Service Required		Amber	This LED is lit when the system is running and the hard drive is faulty.
3	OK/Activity	OK	Green	This LED lights when data is being read from or written to the hard drive.

The front and rear panel Service Required LEDs are also lit if the system detects a hard drive fault.

4.3 About the Fan Modules

4.3.1 About Sun SPARC Enterprise T5120 Server Fans

Four fan modules are located under the top cover door. Each fan module contains two fans mounted in an integrated, hot-swappable CRU. If a fan module fails, replace it as soon as possible to maintain server availability.

4.3.2 About Sun SPARC Enterprise T5220 Server Fans

Three fan modules are located under the top cover door. Each fan module contains two fans mounted in an integrated, hot-swappable CRU. If a fan module fails, replace it as soon as possible to maintain server availability.

Caution – Hazardous moving parts. Unless the power to the server is completely shut down, the only service permitted in the fan compartment is the replacement of the fan modules by trained personnel.

4.3.3 Fan Module LEDs

Each fan module contains a series of LEDs, visible when you open the fan tray access door.

See TABLE 4-2 for a description of fan tray module LEDs and their function.

TABLE 4-2 Fan Module Status LEDs

LED		Color	Notes
Power/OK		Green	This LED is lit when the system is powered on and the fan module is functioning correctly.
Service Required		Amber	This LED is lit when the fan module is faulty. In addition, the system Fan Fault LED is lit.

The front and rear panel Service Required LEDs are also lit if the system detects a fan module fault. In addition, the system Overtemp LED might be lit if a fan fault causes an increase in system operating temperature.

See Section 1.3.3, "Front Panel LEDs" on page 1-13 and Section 1.4.3, "Rear Panel LEDs" on page 1-17 for more information about system status LEDs.

4.4 About the Power Supplies

Some versions of the server are equipped with redundant hot-swappable power supplies. Redundant power supplies enable you to remove and replace a power supply without shutting the server down, provided that the other power supply is online and working.

The following LEDs are lit when a power supply fault is detected:

- Front and rear Service Required LEDs.
- Rear PS Failure LED on the bezel of the server
- Fault LED on the faulty power supply

See Section 1.3.3, "Front Panel LEDs" on page 1-13 and Section 1.4.3, "Rear Panel LEDs" on page 1-17 for more information about identifying and interpreting system LEDs.

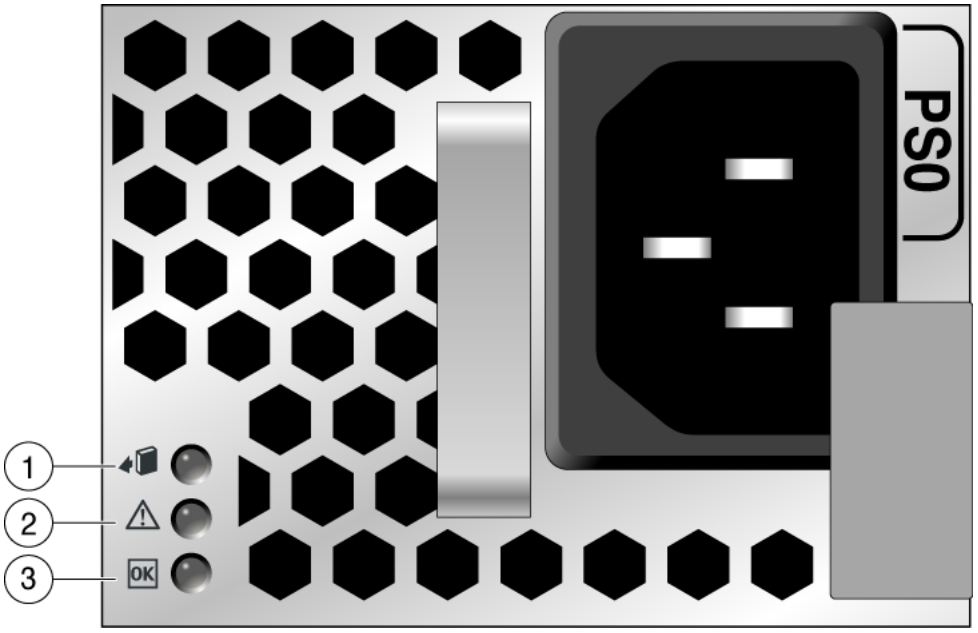
See Section 4.4.1, "Power Supply LEDs" on page 4-6 for specific information about power supply status LEDs.

Note – If a power supply fails and you do not have a replacement available, leave the failed power supply installed to ensure proper airflow in the server.

4.4.1 Power Supply LEDs

Each power supply contains a series of LEDs, visible when looking at the back panel of the system.

FIGURE 4-2 Power Supply Status LEDs (Sun SPARC Enterprise T5120 Server Shown)



See TABLE 4-3 for a description of power supply LEDs and their function, listed from top to bottom.

TABLE 4-3 Power Supply Status LEDs

Legend	LED		Color	Notes
1	Ready to Remove		Blue	This LED is lit to indicate that a power supply can be removed safely during a hot-swap operation.
2	Fault		Amber	This LED is lit when the power supply is faulty.
3	AC Present	OK	Green	This LED is lit when the power supply is plugged in and AC power is available, regardless of system power state.

The front and rear panel Service Required LEDs are also lit if the system detects a power supply fault.

4.5 Hot-Plugging a Hard Drive

4.5.1 Removing a Hard Drive

Removing a hard drive from the server is a three-step process. You must first identify the drive you wish to remove, unconfigure that drive from the server, and then manually remove the drive from the chassis.

Note – See Section 4.8, "Reference for Hard Drive Configuration" on page 4-21 for information about identifying hard drives.

Perform the following process to remove a hard drive:

1. **At the Solaris prompt, issue the `cfgadm -al` command to list all drives in the device tree, including drives that are not configured. Type:**

```
# cfgadm -al
```

This should identify the `Ap_id` for the hard drive you wish to remove, as in CODE EXAMPLE 4-1.

CODE EXAMPLE 4-1 Sample Ap_id Output

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                              scsi-bus     connected    configured   unknown
c0::dsk/c0t0d0                  disk         connected    configured   unknown
c0::dsk/c0t1d0                  disk         connected    configured   unknown
usb0/1                          unknown      empty        unconfigured ok
usb0/2                          unknown      empty        unconfigured ok
usb0/3                          unknown      empty        unconfigured ok
usb1/1                          unknown      empty        unconfigured ok
usb1/2                          unknown      empty        unconfigured ok
usb1/3                          unknown      empty        unconfigured ok
usb2/1                          unknown      empty        unconfigured ok
usb2/2                          unknown      empty        unconfigured ok
usb2/3                          unknown      empty        unconfigured ok
usb2/4                          unknown      empty        unconfigured ok
usb2/5                          unknown      empty        unconfigured ok
usb2/6                          unknown      empty        unconfigured ok
usb2/7                          unknown      empty        unconfigured ok
usb2/8                          unknown      empty        unconfigured ok
----------------------------
```

2. **Issue the `cfgadm -c unconfigure` command to unconfigure the disk. For example, type:**

```
# cfgadm -c unconfigure c0::dsk/c0t1d1
```

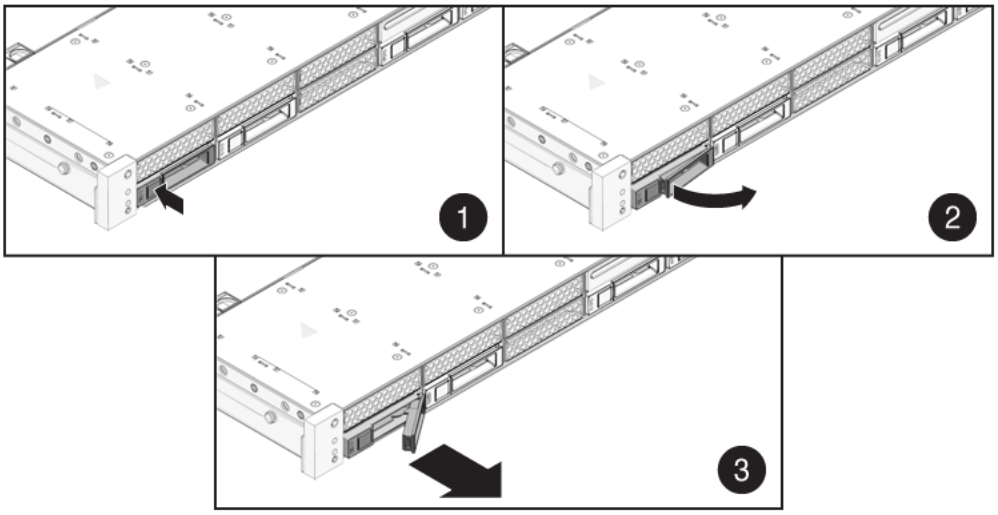
Where `c0:dsk/c0t1d1` is the disk that you are trying to unconfigure.

3. **Wait until the blue Ready-to-Remove LED lights.**

This will help you identify which drive is unconfigured and can be removed.

4. **On the drive you plan to remove, push the hard drive release button to open the latch (FIGURE 4-3).**

FIGURE 4-3 Locating the Hard Drive Release Button and Latch



Caution – The latch is not an ejector. Do not bend it too far to the right. Doing so can damage the latch.

5. **Grasp the latch and pull the drive out of the drive slot.**

4.5.2 Installing a Hard Drive

Installing a hard drive into the Sun SPARC Enterprise T5120 and T5220 servers is a two-step process. You must first install a hard drive into the drive slot that you wish to install the drive in, and then you must configure that drive to the server.

Perform the following process to install a hard drive.

1. **If necessary, remove the blank panel from the chassis.**

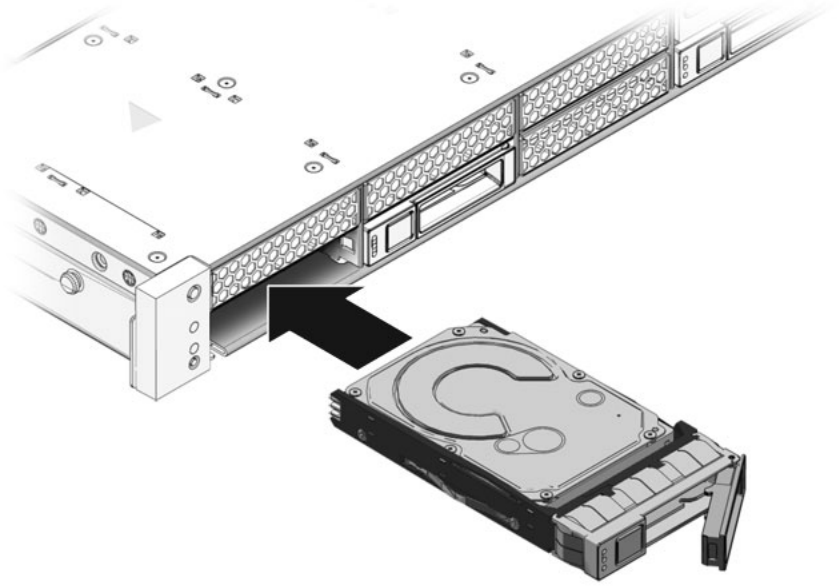
Note – Sun SPARC Enterprise T5120 servers might have up to three blank panels covering unoccupied drive slots. Sun SPARC Enterprise T5220 servers might have as many as seven blank panels covering unoccupied hard drive slots.

---

2. **Align the replacement drive to the drive slot (**FIGURE 4-4**).**

   Hard drives are physically addressed according to the slot in which they are installed. If you removed an existing hard drive from a slot in the server, you must install the replacement drive in the same slot as the drive that was removed.

FIGURE 4-4 Installing a hard drive (Sun SPARC Enterprise T5220 server pictured)



3. **Slide the drive into the drive slot until it is fully seated.**

4. **Close the latch to lock the drive in place.**

5. **At the Solaris prompt, issue the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured. Type:**

```
# cfgadm -al
```

This should help you identify the `Ap_id` for the hard drive you installed. For example, the output should look like:

TABLE 4-4 Sample `Ap_id` Output

```
Ap_id                          Type         Receptacle   Occupant     Condition
c0                              scsi-bus     connected    configured   unknown
c0::dsk/c0t0d0                  disk         connected    configured   unknown
c0::sd1                         disk         connected    unconfigured unknown
usb0/1                          unknown      empty        unconfigured ok
usb0/2                          unknown      empty        unconfigured ok
usb0/3                          unknown      empty        unconfigured ok
usb1/1                          unknown      empty        unconfigured ok
usb1/2                          unknown      empty        unconfigured ok
usb1/3                          unknown      empty        unconfigured ok
usb2/1                          unknown      empty        unconfigured ok
usb2/2                          unknown      empty        unconfigured ok
usb2/3                          unknown      empty        unconfigured ok
usb2/4                          unknown      empty        unconfigured ok
usb2/5                          unknown      empty        unconfigured ok
usb2/6                          unknown      empty        unconfigured ok
usb2/7                          unknown      empty        unconfigured ok
usb2/8                          unknown      empty        unconfigured ok
---------------------------------
```

6. **Issue the `cfgadm -c configure` command to configure the disk. For example, type:**

```
# cfgadm -c configure c0::sd1
```

Where `c0::sd1` is the disk that you are trying to configure.

7. **Wait until the blue Ready-to-Remove LED goes off on the drive that you installed.**

8. **At the Solaris prompt, issue the `cfgadm -al` command to list all drives in the device tree, including any drives that are not configured. Type:**

```
# cfgadm -al
```

This should identify the `Ap_id` for the hard drive that you installed. The drive you installed should be is configured. For example, the output should look like:

TABLE 4-5 Sample `Ap_id` Output

```
Ap_Id                          Type         Receptacle   Occupant     Condition
c0                              scsi-bus     connected    configured   unknown
c0::dsk/c0t0d0                  disk         connected    configured   unknown
c0::dsk/c0t1d0                  disk         connected    configured   unknown
usb0/1                          unknown      empty        unconfigured ok
usb0/2                          unknown      empty        unconfigured ok
usb0/3                          unknown      empty        unconfigured ok
usb1/1                          unknown      empty        unconfigured ok
usb1/2                          unknown      empty        unconfigured ok
usb1/3                          unknown      empty        unconfigured ok
usb2/1                          unknown      empty        unconfigured ok
usb2/2                          unknown      empty        unconfigured ok
usb2/3                          unknown      empty        unconfigured ok
usb2/4                          unknown      empty        unconfigured ok
usb2/5                          unknown      empty        unconfigured ok
usb2/6                          unknown      empty        unconfigured ok
usb2/7                          unknown      empty        unconfigured ok
usb2/8                          unknown      empty        unconfigured ok
----------------------------------
```

9. **Issue the `iostat -E` command. Type:**

```
# iostat -E
```

The `iostat -E` command displays information about your systems installed devices such as manufacturer, model number, serial number, size and system error statistics.

4.6 Hot-Swapping a Fan Module

The following LEDs are lit when a fan module fault is detected:

- Front and rear Service Required LEDs
- Top Fan LED on the front of the server
- Fan Fault LED on or adjacent to the faulty fan module

Note – See Section 1.2, "Chassis Overview" on page 1-8 for more information about identifying and interpreting system LEDs.

If an overtemperature conditions occurs, the front panel CPU overtemperature LED lights and a message is displayed on the console and logged by the service processor. See Section 4.9, "Reference for Fan Module Configuration" on page 4-23 to map fan module locations to service processor alerts.

Tip – You can use the `showfaults` command at the `sc>` prompt to view the current faults.

4.6.1 Removing a Fan Module

1. **Extend the server into the maintenance position. See** Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6**.**
2. **Lift the latch, and open the top cover door.**

Note – The system may start to overheat if the top cover door is left open for more than 60 seconds.

---

3. **The faulty fan module is identified with a corresponding Fault LED.**

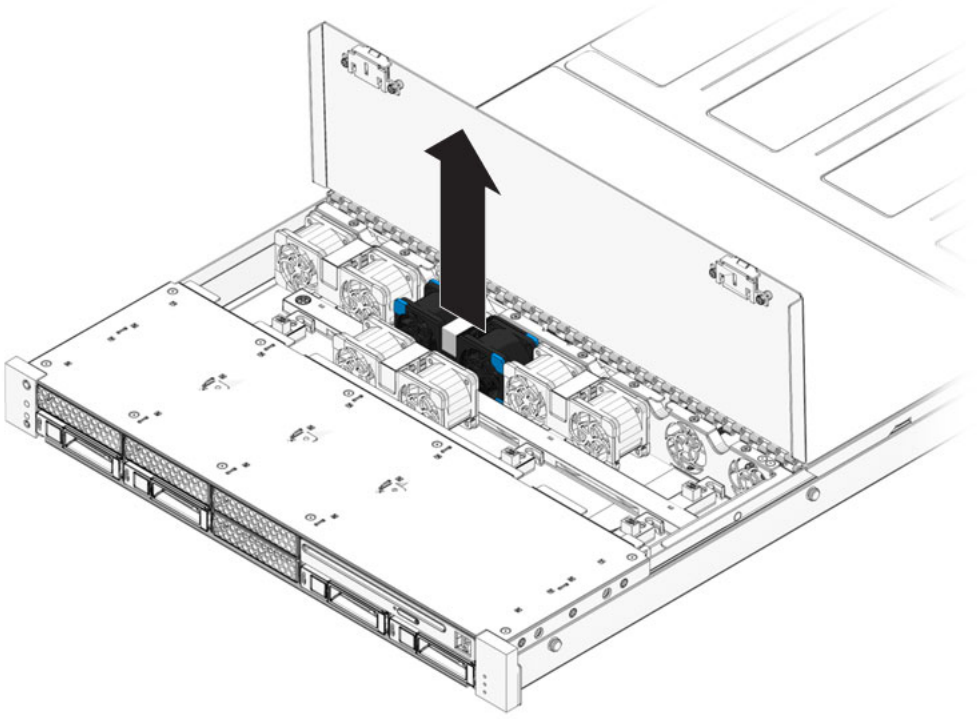
   On the Sun SPARC Enterprise T5120 server, the Fan Fault LEDs are located on the fan board.

   On the Sun SPARC Enterprise T5220 server, the Fan Fault LEDs are located on the fan modules.

4. **Pull up on the green fan module label until the fan module is removed from the chassis.**

Caution – When changing the fan modules note that only the fan modules may be removed or replaced. Do not service any other components in the fan compartment unless the system is shut down and the power cords removed. Pull up the fan module by holding the green label only.

FIGURE 4-5 Removing a Fan Module.



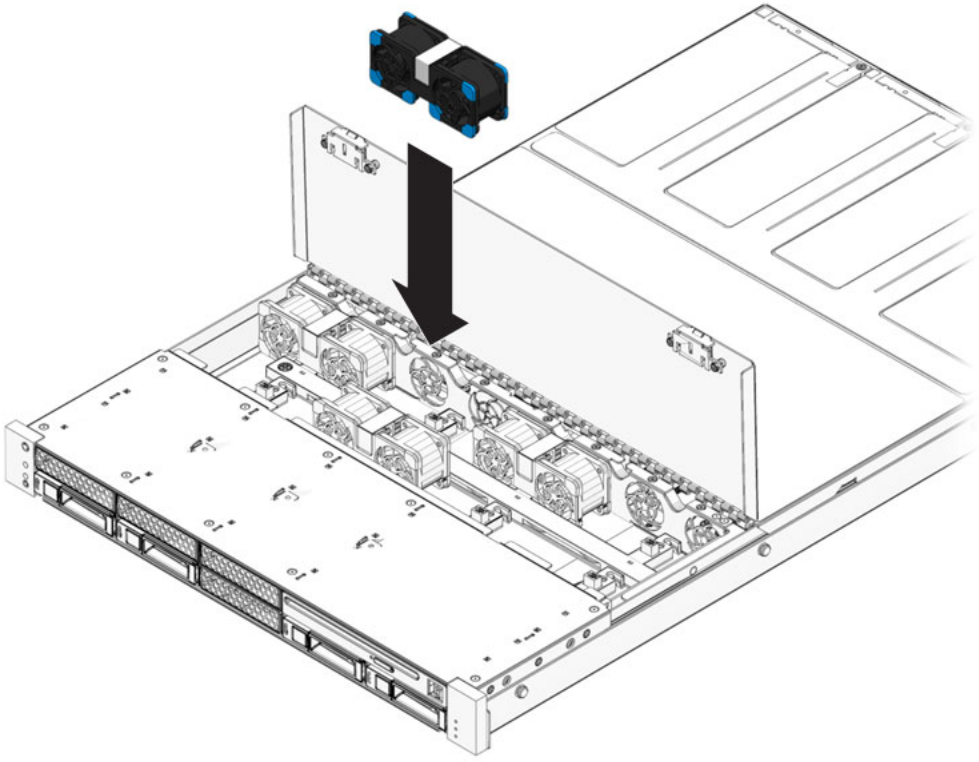
4.6.2 Installing a Fan Module

Caution – To ensure proper system cooling, do not install a replacement fan module anywhere other than in the affected slot.

1. **With the top cover door open, install the replacement fan module into the server (**FIGURE 4-5**).**

   The fan modules are keyed to ensure they are installed in the correct orientation.

FIGURE 4-6 Installing a Fan Module



2. **Apply firm pressure to fully seat the fan module.**
3. **Verify that the Fan Fault LED on the replaced fan module is not lit.**
4. **Close the top cover door.**
5. **Verify that the system Fan Fault LED, Service Required LEDs, and the individual fan module Fault LED are not lit. In addition, use the `showfaults` command to verify proper operation. See** Section 2.3.4, "Running the `showfaults` Command" on page 2-17**.**

Note – See Section 1.2, "Chassis Overview" on page 1-8 for more information about identifying and interpreting system LEDs.

4.7 Hot-Swapping a Power Supply

4.7.1 Removing a Power Supply

Caution – Hazardous voltages are present. To reduce the risk of electric shock and danger to personal health, follow the instructions.

1. **Identify which power supply (0 or 1) requires replacement.**

   A lit (amber) Fault LED on a power supply indicates that a failure was detected. In addition, the `showfaults` command indicates which power supply is faulty. See Section 2.3.4, "Running the `showfaults` Command" on page 2-17.

2. **Gain access to the rear of the server where the faulty power supply is located.**

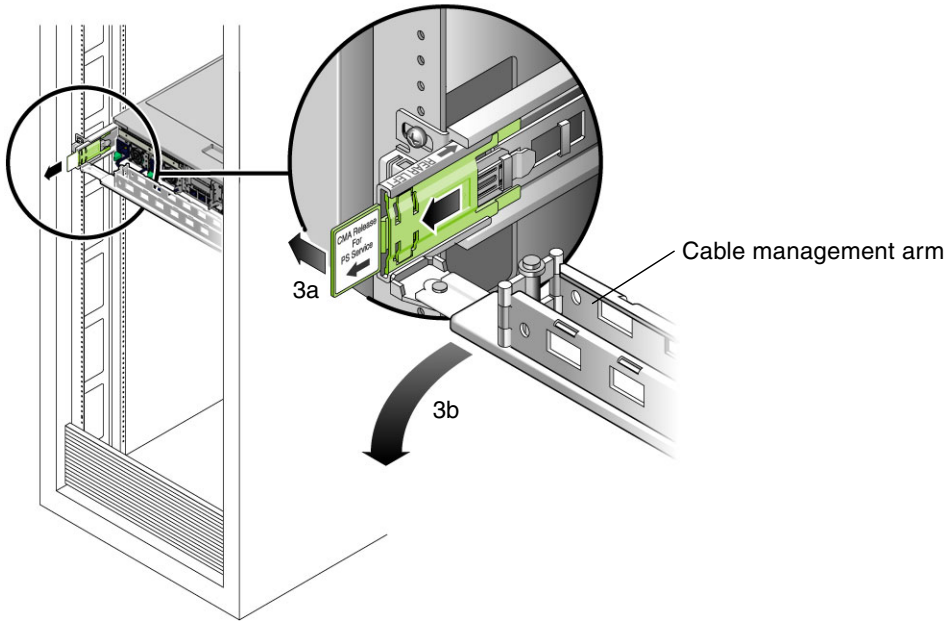
3. **Release the cable management arm (CMA) (**FIGURE 4-7**).**

   The CMA is located at the rear of the server rack.

   a. **Press and hold the tab.**

   b. **Rotate the cable management arm out of the way so that you can access the power supply.**

FIGURE 4-7 Releasing the cable management arm



4. **Disconnect the power cord from the faulty power supply.**
5. **Grasp the power supply handle and press the release latch.**

FIGURE 4-8 Power Supply Release Handle (Sun SPARC Enterprise T5120)

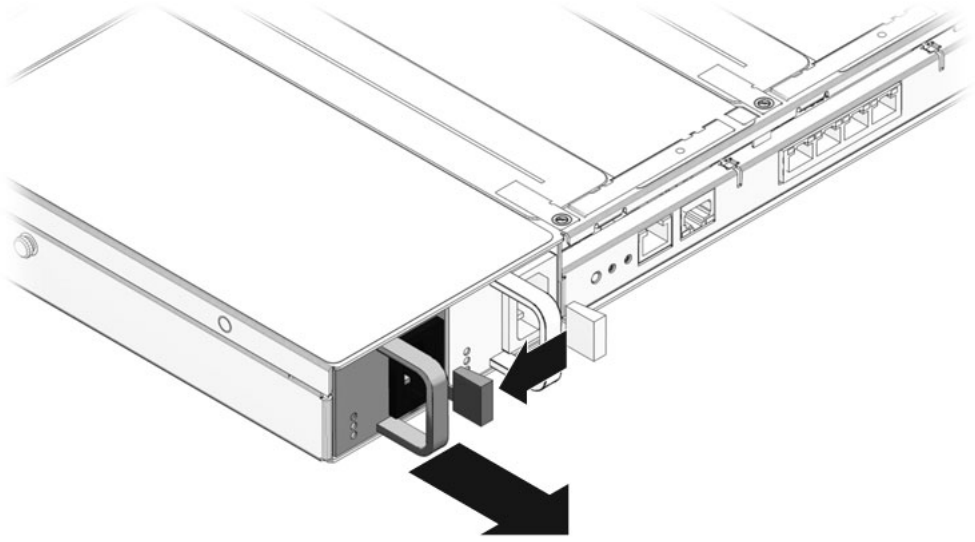
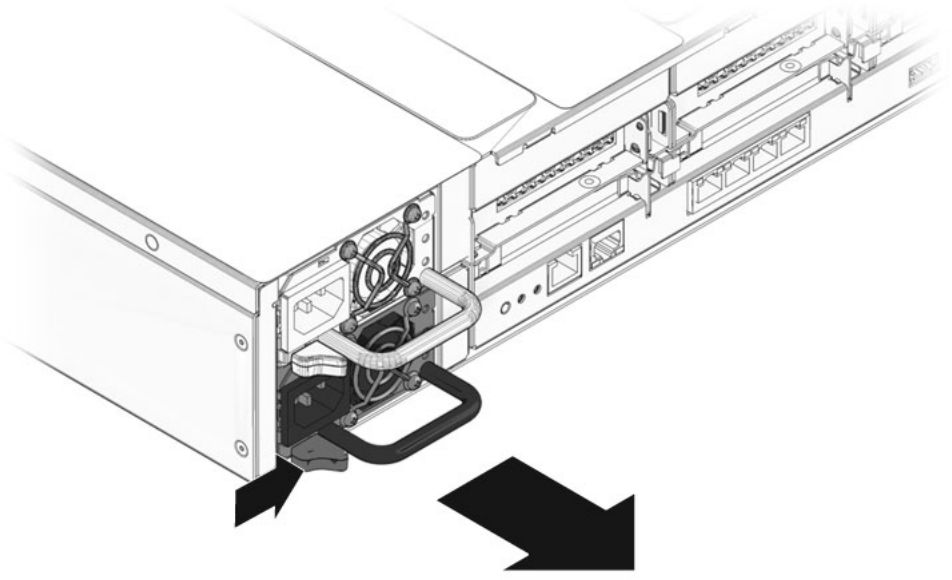


FIGURE 4-9 Power Supply Release Handle (Sun SPARC Enterprise T5220)



6. **Pull the power supply out of the chassis.**

4.7.2 Installing a Power Supply

1. **Align the replacement power supply with the empty power supply chassis bay.**
2. **Slide the power supply into the bay until it is fully seated.**

FIGURE 4-10 Installing a Power Supply (Sun SPARC Enterprise T5120)

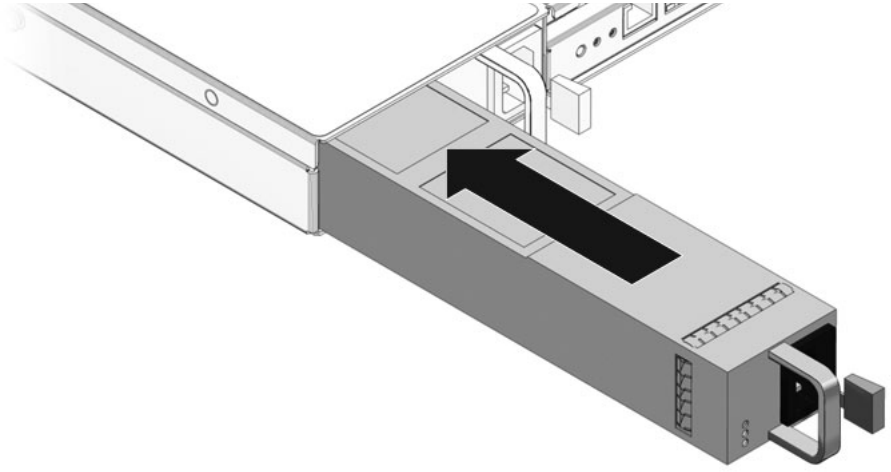
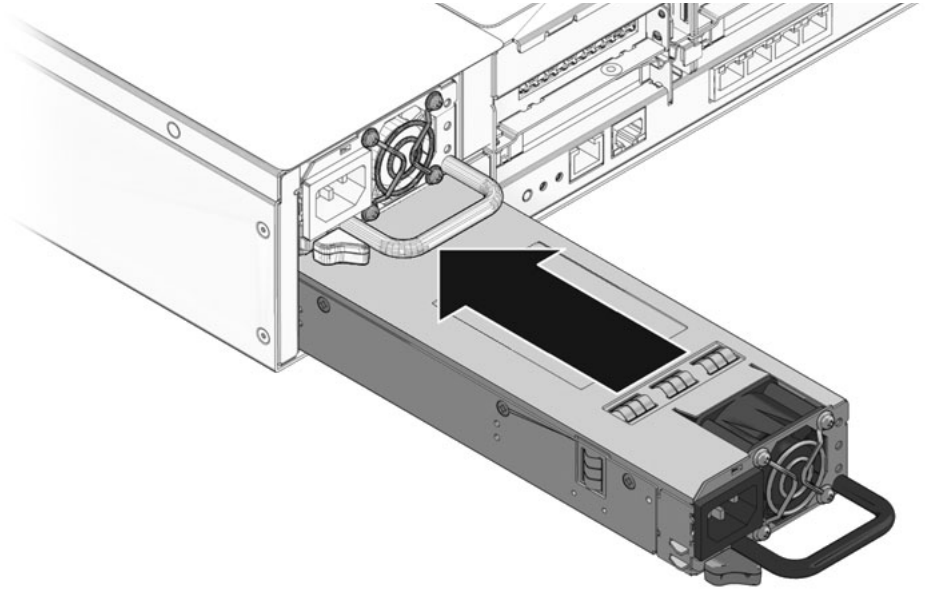


FIGURE 4-11 Installing a Power Supply (Sun SPARC Enterprise T5220)



3. **Reconnect the power cord to the power supply.**
   Verify that the AC Present LED is lit.

4. **Close the CMA, inserting the end of the CMA into the rear left rail bracket (FIGURE 4-7).**

5. **Verify that the Fault LED on the replaced power supply, the system Power Supply Fault LED, and the front and rear Service Required LEDs are not lit.**

Note – See Section 1.2, "Chassis Overview" on page 1-8 for more information about identifying and interpreting system LEDs.

---

6. **At the ALOM CMT `sc>` prompt, type the `showenvironment` command to verify the status of the power supplies.**

4.8 Reference for Hard Drive Configuration

4.8.1 Sun SPARC Enterprise T5120 Server Hard Drive Locations

TABLE 4-6 describes physical drive locations for the Sun SPARC Enterprise T5120 server, as viewed from the front of the system.

TABLE 4-6 Physical Drive Locations (Sun SPARC Enterprise T5120 Server)

		DVD drive	
HDD0	HDD1	HDD2	HDD3

TABLE 4-7 lists physical drive locations and their corresponding default pathnames in OpenBoot PROM and Solaris for the Sun SPARC Enterprise T5120 server.

TABLE 4-7 Physical Drive Locations, FRU Names, and Default Drive Pathnames (Sun SPARC Enterprise T5120 Server)

Physical Location	FRU Name	OpenBoot PROM/Solaris Default Drive Pathname
HDD0	/SYS/HDD0	`c0::dsk/c1t0d0`
HDD1	/SYS/HDD1	`c0::dsk/c1t1d0`
HDD2	/SYS/HDD2	`c0::dsk/c1t2d0`
HDD3	/SYS/HDD3	`c0::dsk/c1t3d0`
DVD drive	/SYS/DVD	

Note – Hard drive names in ILOM messages are displayed with the full FRU name, such as /SYS/HDD0.

4.8.2 Sun SPARC Enterprise T5220 Server Hard Drive Locations

TABLE 4-8 describes physical drive locations for the Sun SPARC Enterprise T5220 server, as viewed from the front of the system.

TABLE 4-8 Physical Drive Locations (Sun SPARC Enterprise T5220 Server)

HDD1	HDD3	HDD5	DVD drive	
HDD0	HDD2	HDD4	HDD6	HDD7

TABLE 4-9 lists physical drive locations and their corresponding default pathnames in OpenBoot PROM and Solaris for the Sun SPARC Enterprise T5220 server.

TABLE 4-9 Physical Drive Locations, FRU Addresses, and Default Drive Pathnames (Sun SPARC Enterprise T5220 Server)

Physical Location	FRU Address	OpenBoot PROM/Solaris Default Drive Pathname
HDD0	/SYS/HDD0	`c0::dsk/c1t0d0`
HDD1	/SYS/HDD1	`c0::dsk/c1t1d0`
HDD2	/SYS/HDD2	`c0::dsk/c1t2d0`
HDD3	/SYS/HDD3	`c0::dsk/c1t3d0`
HDD4	/SYS/HDD4	`c0::dsk/c1t4d0`
HDD5	/SYS/HDD5	`c0::dsk/c1t5d0`
HDD6	/SYS/HDD6	`c0::dsk/c1t6d0`
HDD7	/SYS/HDD7	`c0::dsk/c1t7d0`
DVD Drive	/SYS/DVD	

Note – Hard drive names in ILOM messages are displayed with the full FRU name, such as /SYS/HDD0.

4.9 Reference for Fan Module Configuration

Note – Fan module names in ILOM messages are displayed with the full FRU name, such as /SYS/FANBD1/FM1.

4.9.1 Sun SPARC Enterprise T5120 Fan Module Locations

TABLE 4-10 describes the FRU device names for the fan modules in the Sun SPARC Enterprise T5120 server, as viewed from the front of the system.

TABLE 4-10 Sun SPARC Enterprise T5120 Fan Module Locations and FRU Names

/SYS/FANBD1/FM0	/SYS/FANBD1/FM1	/SYS/FANBD1/FM2	(Empty)
(Empty)	/SYS/FANBD0/FM1	(Empty)	(Empty)

Note – To ensure proper system cooling, fan modules must occupy the slots as shown in TABLE 4-10.

4.9.2 Sun SPARC Enterprise T5220 Fan Module Locations

TABLE 4-11 describes the FRU device names for the fan modules in the Sun SPARC Enterprise T5220 server, as viewed from the front of the system.

TABLE 4-11 Sun SPARC Enterprise T5220 Fan Module Locations and FRU Names

/SYS/FANBD1/FM0	/SYS/FANBD1/FM1	/SYS/FANBD1/FM2
(Empty)	(Empty)	(Empty)

Note – To ensure proper system cooling, fan modules must occupy the slots as shown in TABLE 4-11.

4.10 Reference For Power Supply Configuration

TABLE 4-12 describes the FRU device names for power supplies in the server.

TABLE 4-12 Power Supply FRU Names

Physical Device	FRU Name
PS0	/SYS/PS0
PD1	/SYS/PS1

Note – Power supply names in ILOM messages are displayed with the full FRU name, such as /SYS/PS0.

CHAPTER 5

Servicing Motherboard Components

This chapter describes how to replace the motherboard and its components in the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers.

Note – Before performing any of the procedures in this chapter, perform the procedures described in Chapter 3.

The following topics are covered in this chapter:

- Section 5.1, "Servicing FB-DIMMs" on page 5-2
- Section 5.2, "Servicing the Air Baffle" on page 5-11
- Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13
- Section 5.4, "Servicing PCIe/XAUI Cards" on page 5-17
- Section 5.5, "Servicing the Battery" on page 5-22
- Section 5.6, "Servicing the SCC Module" on page 5-24
- Section 5.7, "Servicing the Motherboard Assembly" on page 5-26
- Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30
- Section 5.9, "Reference for PCIe and XAUI Card Configuration" on page 5-35

Caution – You must disconnect both power supplies before servicing any of the components documented in this chapter.

Caution – Never attempt to run the server with the covers removed. Hazardous voltage present.

Caution – Equipment damage possible. The covers must be in place for proper air flow.

5.1 Servicing FB-DIMMs

This section describes how to diagnose and replace faulty FB-DIMMs. If you are upgrading the system with additional FB-DIMMs, see Section 5.1.5, "Installing Additional FB-DIMMs" on page 5-10. For FB-DIMM configuration guidelines, see Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30.

Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid this problem, ensure that you follow antistatic practices as described in "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 11.

Caution – Ensure that all power is removed from the server before removing or installing FB-DIMMs. You must disconnect the power cables before performing this procedure.

5.1.1 Locating a Faulty FB-DIMM

The system Service Required LED lights if the system detects a FB-DIMM fault.

Use the `showfaults` command to identify faulty FB-DIMMs. See Section 2.3.4, "Running the `showfaults` Command" on page 2-17.

Use the FB-DIMM fault locator button on the motherboard to identify faulty FB-DIMMs.

1. **Extend the server to the maintenance position.**

   See Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6.

2. **Unplug all power cords.**

   See Section 3.5, "Disconnecting Power Cords from the Server" on page 3-6.

3. **Remove the top cover.**

   See Section 3.9, "Removing the Top Cover" on page 3-12.

4. **Open the air baffle to access the FB-DIMM fault locator button.**

5. **Press the FB-DIMM fault locator button on the motherboard.**

   The button is located on the left edge of the motherboard, next to /SYS/MB/CMP0/BR3/CH1/D1 (J1701).

6. **Note the location of faulty FB-DIMMs.**

   Faulty FB-DIMMs are identified with a corresponding amber LED on the motherboard.

Note – The FB-DIMM fault LEDs remain lit only for a few minutes.

---

7. **Ensure that all FB-DIMMs are seated correctly in their slots.**

5.1.2 Removing FB-DIMMs

1. **Review the section,** Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30**.**
2. **Extend the server to the maintenance position.**

   See Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6.
3. **Unplug all power cords.**

   See Section 3.5, "Disconnecting Power Cords from the Server" on page 3-6.
4. **Remove the top cover.**

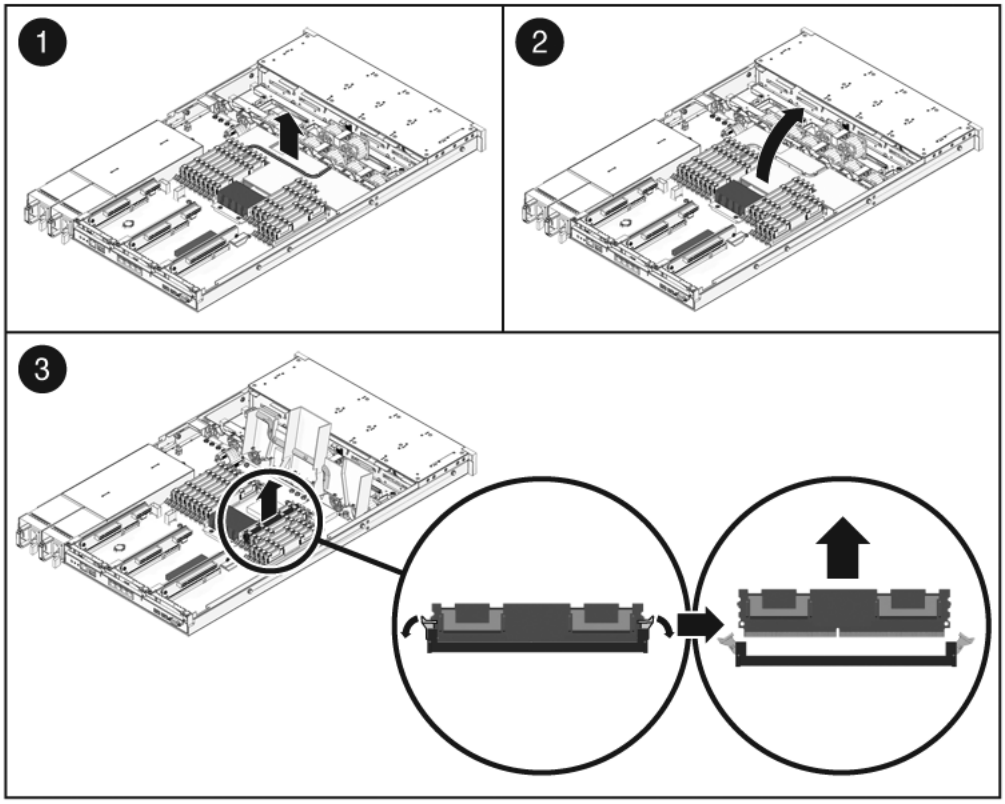
   See Section 3.9, "Removing the Top Cover" on page 3-12.
5. **(Sun SPARC Enterprise T5120 server) Disconnect and stow the hard drive data cable.**

   a. **Unplug the hard drive data cable from J6401 on the motherboard.**

   b. **Remove the hard drive data cable from its seat on the CPU air baffle.**

   c. **Place the hard drive cable end out of the way of the air baffle.**
6. **Rotate the air baffle up and toward the front of the system.**

FIGURE 5-1 Removing FB-DIMMs



7. **If you are replacing a faulty FB-DIMM, locate the FB-DIMMs that you want to replace.**

   Press the DBDIMM DIAG button on the motherboard to activate the DB-DIMM status LEDs. Any faulty FB-DIMMs will be indicated with a corresponding amber fault LED on the motherboard.

Tip – Make a note of the faulty FB-DIMM location so that you can install the replacement FB-DIMM in the same location.

Note – For memory configuration information see Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30.

---

8. **Push down on the ejector tabs on each side of the FB-DIMM until the FB-DIMM is released (**FIGURE 5-1**).**
9. **Grasp the top corners of the faulty FB-DIMM and remove it from the server.**
10. **Place the FB-DIMM on an antistatic mat.**
11. **Repeat** Step 8 **through** Step 10 **to remove any additional FB-DIMMs.**

5.1.3 Installing FB-DIMMs

Caution – Ensure that all power is removed from the server before removing or installing FB-DIMMs or damage to the FB-DIMMs might occur. You must disconnect the power cables from the system before performing this procedure.

---

1. **Unpackage the replacement FB-DIMMs and place them on an antistatic mat.**

Tip – See Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30 for information about configuring the FB-DIMMs.

---

2. **Ensure that the ejector tabs are in the open position.**
3. **Line up the replacement FB-DIMM with the connector (**FIGURE 5-1**).**

   Align the FB-DIMM notch with the key in the connector. This ensures that the FB-DIMM is oriented correctly.
4. **Push the FB-DIMM into the connector until the ejector tabs lock the FB-DIMM in place.**

   If the FB-DIMM does not easily seat into the connector, verify that the orientation of the FB-DIMM is as shown in FIGURE 5-1. If the orientation is reversed, damage to the FB-DIMM might occur.
5. **Repeat** Step 2 **through** Step 4 **until all replacement FB-DIMMs are installed.**
6. **Rotate the air baffle back into its operating position.**

   The air baffle snaps into position above the CPU and memory modules.
7. **(Sun SPARC Enterprise T5120 server) Reconnect the hard drive data cable.**
   a. **Route the hard drive data cable over the fan module and along the air baffle.**
   b. **Plug the data cable into J6401 on the motherboard.**

8. **Install the top cover.**

   See Section 7.1, "Installing the Top Cover" on page 7-2.

9. **Slide the server into the rack.**

   See Section 7.3, "Returning the Server to the Normal Rack Position" on page 7-4.

10. **Connect the power supplies.**

    See Section 7.4, "Connecting Power Cords to the Server" on page 7-5.

5.1.4 Verifying Successful Replacement of a Faulty FB-DIMM

1. **Access the ALOM CMT `sc>` prompt.**

   Refer to the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers* for instructions.

2. **Run the `showfaults -v` command to determine how to clear the fault.**

   The method you use to clear a fault depends on how the fault is identified by the `showfaults` command.

   Examples:

   - If the fault is a *host-detected fault* (displays a UUID), continue to Step 3. For example:

```
sc> showfaults
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
ID FRU                          Fault
0  /SYS/MB/CMP0/BR2/CH1/D0      Host detected fault, MSGID:
SUN4V-8000-DX  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

   - If the fault was detected by POST and resulted in the FB-DIMM being disabled, such as the following,

```
sc> showfaults
Last POST Run: Wed Jun 27 21:29:02 2007

Post Status: Passed all devices
ID FRU                       Fault
0 /SYS/MB/CMP0/BR3/CH1/D1 SP detected fault:
/SYS/MB/CMP0/BR3/CH1/D1 Forced fail (POST)
```

In most cases, the replacement of the faulty FB-DIMM(s) is detected when the service processor is power cycled. In this case, the fault is automatically cleared from the system. If the faulit is still displayed by the `showfaults` command, then run the `enablecomponent` command to enable the FB-DIMM and clear the fault.

```
sc> enablecomponent /SYS/MB/CMP0/BR3/CH1/D1
```

3. **Perform the following steps to verify the repair:**

   a. **Set the virtual keyswitch to `diag` so that POST will run in Service mode.**

```
sc> setkeyswitch diag
```

   b. **Issue the `poweron` command.**

```
sc> poweron
```

   c. **Switch to the system console to view POST output.**

```
sc> console
```

Watch the POST output for possible fault messages. The following output is a sign that POST did not detect any faults:

```
.
.
.
0:0:0>INFO:
0:0:0>    POST Passed all devices.
0:0:0>POST:    Return to VBSC.
0:0:0>Master set ACK for vbsc runpost command and spin...
```

Note – Depending on the configuration of ILOM POST variables and whether POST detected faults or not, the system might boot, or the system might remain at the `ok` prompt. If the system is at the `ok` prompt, type `boot`.

---

d. Return the virtual keyswitch to normal mode.

```
sc> setkeyswitch normal
```

e. Issue the Solaris OS `fmadm faulty` command.

```
# fmadm faulty
```

No memory faults should be displayed.

If faults are reported, refer to the diagnostics flowchart in FIGURE 3-1 for an approach to diagnose the fault.

4. **Gain access to the ALOM CMT `sc>` prompt.**

5. **Run the `showfaults` command.**

   - If the fault was detected by the host and the fault information persists, the output will be similar to the following example:

```
sc> showfaults
Last POST Run: Wed Jun 29 11:29:02 2007

Post Status: Passed all devices
ID FRU                          Fault
0  /SYS/MB/CMP0/BR2/CH1/D0      Host detected fault, MSGID: SUN4V-
8000-DX  UUID: 7ee0e46b-ea64-6565-e684-e996963f7b86
```

   - If the `showfaults` command does not report a fault with a UUID, then you do not need to proceed with the following steps because the fault is cleared.

6. **Run the `clearfault` command.**

```
sc> clearfault 7ee0e46b-ea64-6565-e684-e996963f7b86
```

7. **Switch to the system console.**

```
sc> console
```

8. **Issue the** `fmadm repair` **command with the UUID.**

   Use the same UUID that you used with the `clearfault` command.

```
# fmadm repair 7ee0e46b-ea64-6565-e684-e996963f7b86
```

5.1.5 Installing Additional FB-DIMMs

Before you begin, read Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30, to familiarize yourself with FB-DIMM configuration guidelines.

Caution – Ensure that all power is removed from the server before installing FB-DIMMs or damage to the FB-DIMMs might occur.

Caution – You must disconnect the power cables from the system before performing this procedure.

1. **Unpackage the replacement FB-DIMMs and place them on an antistatic mat.**
2. **(Sun SPARC Enterprise T5120 server) Disconnect and stow the hard drive data cable.**
   a. **Unplug the hard drive data cable from J6401 on the motherboard.**
   b. **Remove the hard drive data cable from its seat on the CPU air baffle.**
   c. **Place the hard drive cable end out of the way of the air baffle.**
3. **Rotate the air baffle up and toward the front of the system.**
4. **Ensure that the ejector tabs are in the open position.**
5. **Line up the FB-DIMM with the connector (**FIGURE 5-1**).**

   Align the FB-DIMM notch with the key in the connector. This ensures that the FB-DIMM is oriented correctly.
6. **Push the FB-DIMM into the connector until the ejector tabs lock the FB-DIMM in place.**

   If the FB-DIMM does not easily seat into the connector, verify that the orientation of the FB-DIMM is as shown in FIGURE 5-1. If the orientation is reversed, damage to the FB-DIMM might occur.
7. **Repeat** Step 2 **through** Step 6 **until all FB-DIMMs are installed.**
8. **Rotate the air baffle back into its operating position.**

   The air baffle snaps into position above the CPU and memory modules.
9. **(Sun SPARC Enterprise T5120 server) Reconnect the hard drive data cable.**
   a. **Route the hard drive data cable over the fan module and along the air baffle.**
   b. **Plug the data cable into J6401 on the motherboard.**

10. **Install the top cover.**

    See Section 7.1, “Installing the Top Cover” on page 7-2.

11. **Slide the server into the rack.**

    See Section 7.3, “Returning the Server to the Normal Rack Position” on page 7-4.

12. **Connect the power supplies.**

    See Section 7.4, “Connecting Power Cords to the Server” on page 7-5.

13. **Power on the server.**

    See Section 7.5, “Powering On the Server” on page 7-5.

14. **Perform the following steps to verify that there are no faults:**

    a. **Set the virtual keyswitch to Diag mode so that POST will run in Service mode.**

```
sc> setkeyswitch diag
```

    b. **Issue the `poweron` command.**

```
sc> poweron
```

    c. **After POST completes, run the showfaults command.**

    No memory faults should be displayed.

Note – Depending on the configuration of ILOM, POST variables, and whether POST detected faults or not, the server might boot, or the system might remain at the `ok` prompt. If the system is at the `ok` prompt, type `boot`.

---

    d. **After the Solaris OS boots, issue the `fmadm faulty` command.**

```
# fmadm faulty
```

    No memory faults should be displayed.

5.2 Servicing the Air Baffle

You must remove the air baffle when removing or installing the following components

- Power distribution board
- Power supply backplane (Sun SPARC Enterprise T5220)
- Fan module boards
- Paddle card
- Hard drive cage
- Hard drive backplane
- Motherboard

Caution – To prevent the system from overheating, ensure that the air baffle is correctly installed before powering on the server.

5.2.1 Removing the Air Baffle

1. **Slide the system out of the rack.**

   See Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6.

2. **Remove the top cover.**

   See Section 3.9, "Removing the Top Cover" on page 3-12.

3. **Open the air baffle.**

   Disengage the rear of the air baffle from the motherboard and rotate the air baffle forward.

4. **Press in the edges of the air baffle to disengage its pins from the chassis.**

5. **Set the air baffle aside.**

5.2.2 Installing the Air Baffle

Caution – When the server is in operation, ensure that the air baffle is correctly installed to prevent the system from overheating.

1. **Use the guide pins to align and install the air baffle into the chassis.**

   Ensure that the air baffle is aligned and fully seated in the chassis.

2. **Rotate the air baffle down until it is seated on the motherboard.**

3. **Install the top cover.**

   See Section 7.1, “Installing the Top Cover” on page 7-2.

4. **Slide the server into the rack.**

   See Section 7.3, “Returning the Server to the Normal Rack Position” on page 7-4.

5. **Connect the power supplies.**

   See Section 7.4, “Connecting Power Cords to the Server” on page 7-5.

6. **Power on the server.**

   See Section 7.5, “Powering On the Server” on page 7-5.

5.3 Servicing PCIe/XAUI Risers

PCIe/XAUI cards are installed on vertical risers. You must remove the PCI cross beam and relevant riser to access a PCIe/XAUI card.

Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid this problem, ensure that you follow antistatic practices as described in Section 3.8, “Performing Electrostatic Discharge – Antistatic Prevention Measures” on page 3-11.

Caution – Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

You must remove PCIe Riser 2 when servicing the SCC module.

You must remove all three PCIe/XAUI risers when servicing the motherboard.

5.3.1 Removing a PCIe/XAUI Riser

1. **Power off the server.**

   See Section 3.4, “Powering Off the Server” on page 3-4

2. **Disconnect all power cables.**

   See Section 3.5, “Disconnecting Power Cords from the Server” on page 3-6.

3. **Attach an anti-static wrist strap.**

   See Section 3.8, "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 3-11.

4. **Disconnect any data cables connected to the cards on the PCIe/XAUI riser being removed.**

   Label the cables to ensure proper connection later.

5. **Slide the server out of the rack.**

   See Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6

6. **If you are servicing a PCIe/XAUI card, locate its position in the system.**

7. **Remove the PCI cross beam.**

   a. **Loosen the two captive Phillips screws on each end of the removable PCI cross beam.**

   b. **Slide the PCI cross beam back to remove it from the chassis.**

      Two mushroom standoffs secure the removable cross beam to the back of the system.

FIGURE 5-2 Removing the PCIe/XAUI Riser (Sun SPARC Enterprise T5120)

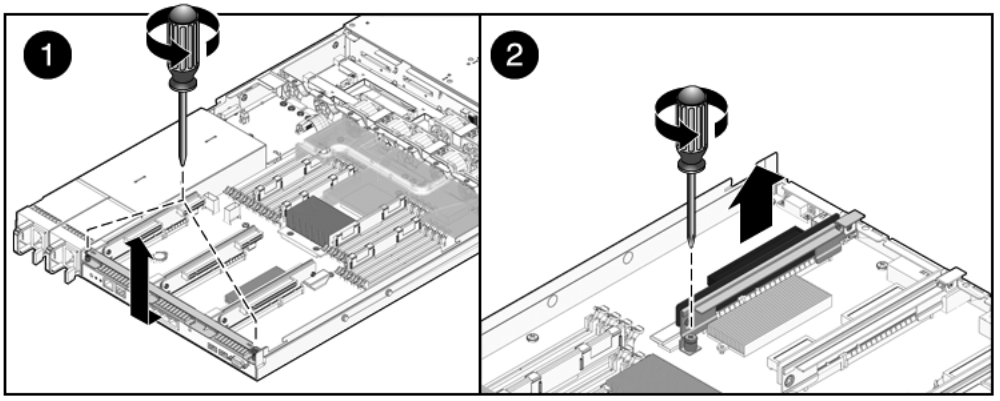
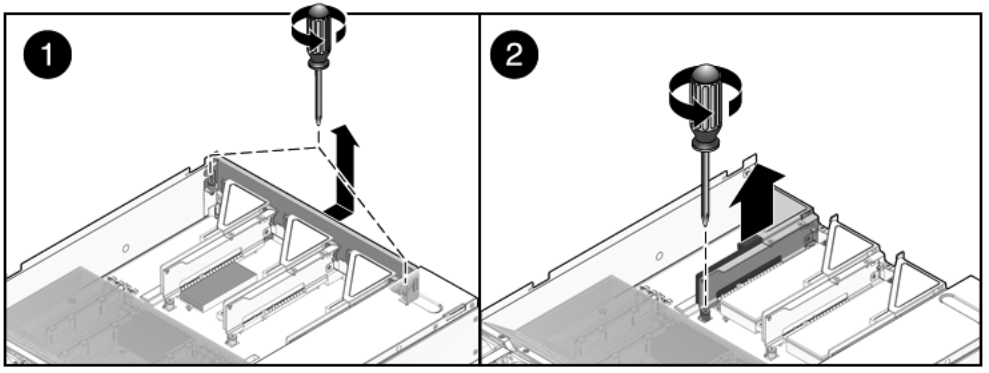


FIGURE 5-3 Removing the PCIe/XAUI Riser (Sun SPARC Enterprise T5220)



8. **Loosen the captive screw securing the riser to the motherboard.**
9. **Lift the riser up to remove it from the system.**
   Remove the riser and any PCIe/XAUI cards attached to it as a unit.

5.3.2 Installing a PCIe/XAUI Riser

1. **Lower the PCIe/XAUI riser and any cards attached to it into the system.**

Note – PCIe/XAUI and PCIe risers have keyed connectors to prevent incorrect installation on the motherboard.

---

2. **Ensure that the PCIe back panels are properly engaged with the corresponding slots in the motherboard tray/back panel connector assembly.**

3. **Tighten the captive screw to secure the riser to the motherboard.**

Note – Ensure that PCIe filler panels are in installed in all empty PCIe/XAUI slots.

FIGURE 5-4 Installing the PCIe/XAUI Riser (Sun SPARC Enterprise T5120)

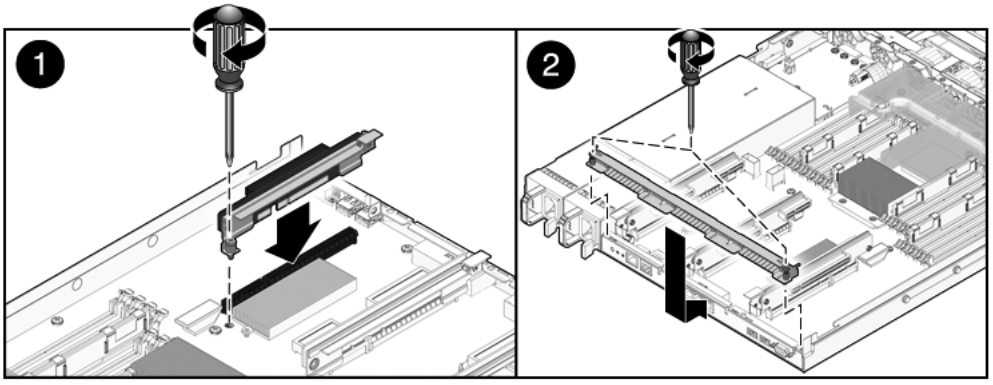
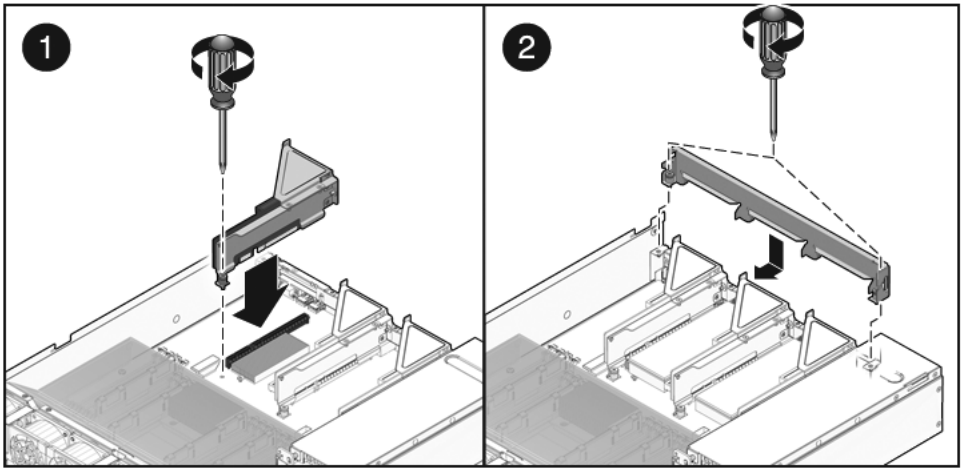


FIGURE 5-5 Installing the PCIe/XAUI Riser (Sun SPARC Enterprise T5220)



4. **Install the PCI cross beam.**

   Slide the cross beam forward over the PCIe/XAUI risers. Ensure that the cross beam is engaged with the mushrooms standoffs on either side of the chassis rear panel PCI cross beam.

5. **Tighten the two captive Phillips screws securing the removable PCI cross beam to the chassis.**

6. **Install the top cover.**

   See Section 7.1, "Installing the Top Cover" on page 7-2.

7. **Slide the server into the rack.**

   See Section 7.3, "Returning the Server to the Normal Rack Position" on page 7-4.

8. **Connect any data cables you removed to service the PCIe/XAUI cards.**

9. **Connect all power cables.**

   See Section 7.4, "Connecting Power Cords to the Server" on page 7-5.

5.4 Servicing PCIe/XAUI Cards

See Section 5.9, "Reference for PCIe and XAUI Card Configuration" on page 5-35 for PCIe/XAUI card configuration guidelines.

Caution – This procedure requires that you handle components that are sensitive to static discharge. This sensitivity can cause the component to fail. To avoid this problem, ensure that you follow antistatic practices as described in Section 3.8, "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 3-11.

Caution – Ensure that all power is removed from the server before removing or installing expansion cards. You must disconnect the power cables before performing this procedure.

5.4.1 Removing PCIe and XAUI Cards

1. **Locate the PCIe/XAUI card that you want to remove, and note its corresponding riser board.**

   See Section 1.4, "About the Rear Panel" on page 1-14 for more information about PCIe/XAUI slots and their locations.

2. **If necessary, make a note of where the PCIe/XAUI cards are installed.**

3. **Unplug all data cables from the card.**

   Note the location of all cables for reinstallation later.

4. **Remove the riser board.**

   See Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13.

5. **Carefully remove the PCIe/XAUI card from the riser board connector.**

6. **Place the PCIe/XAUI card on an antistatic mat.**

7. **If you are not replacing the PCIe/XAUI card, install a PCIe/XAUI filler panel.**

   Observe the following guidelines:

   - Sun SPARC Enterprise T5120: PCIe filler panels are located in the removable PCI cross beam. Press the filler panel into the cross beam from the rear.
   - Sun SPARC Enterprise T5220: PCIe filler panels are located on the riser board assembly. Press the filler panel into the riser board back panel from the rear.

Caution – To ensure proper system cooling and EMI shielding, you must use the appropriate PCIe filler panel for the server.

5.4.2 Installing PCIe or XAUI Cards

1. **Unpackage the replacement PCIe or XAUI card and place it on an antistatic mat.**
2. **Locate the proper PCIe/XAUI slot for the card you are replacing.**
3. **If necessary, review the PCIe and XAUI Card Guidelines to plan your installation.**

   See Section 5.9, "Reference for PCIe and XAUI Card Configuration" on page 5-35 for additional information.

4. **Remove the PCIe/XAUI riser board.**

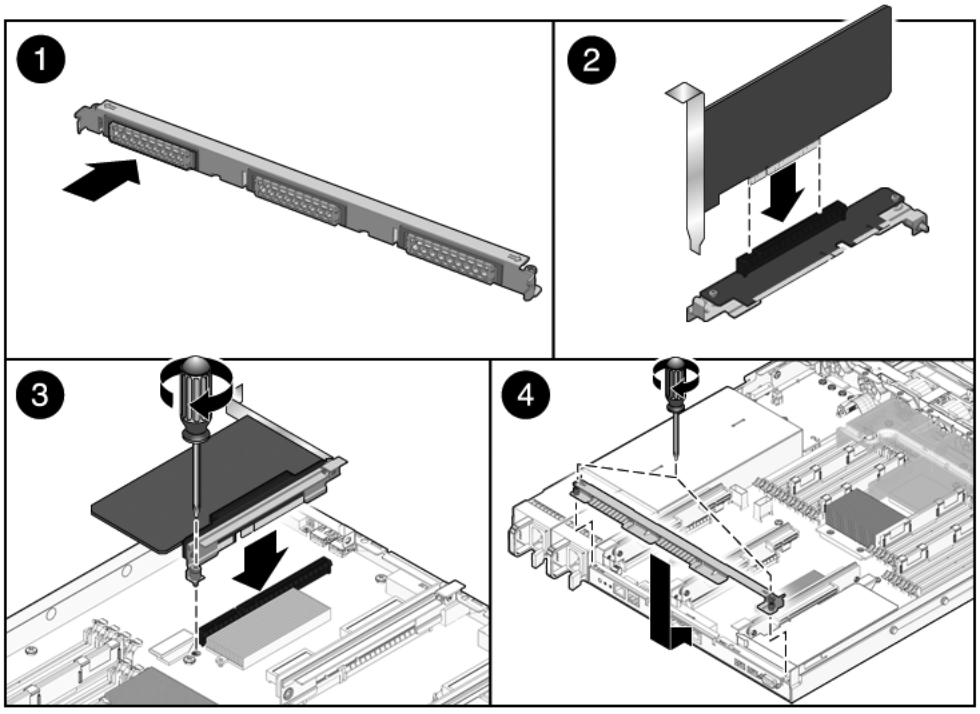
   See Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13.

5. **Remove the PCI filler panel.**

   Observe the following guidelines:

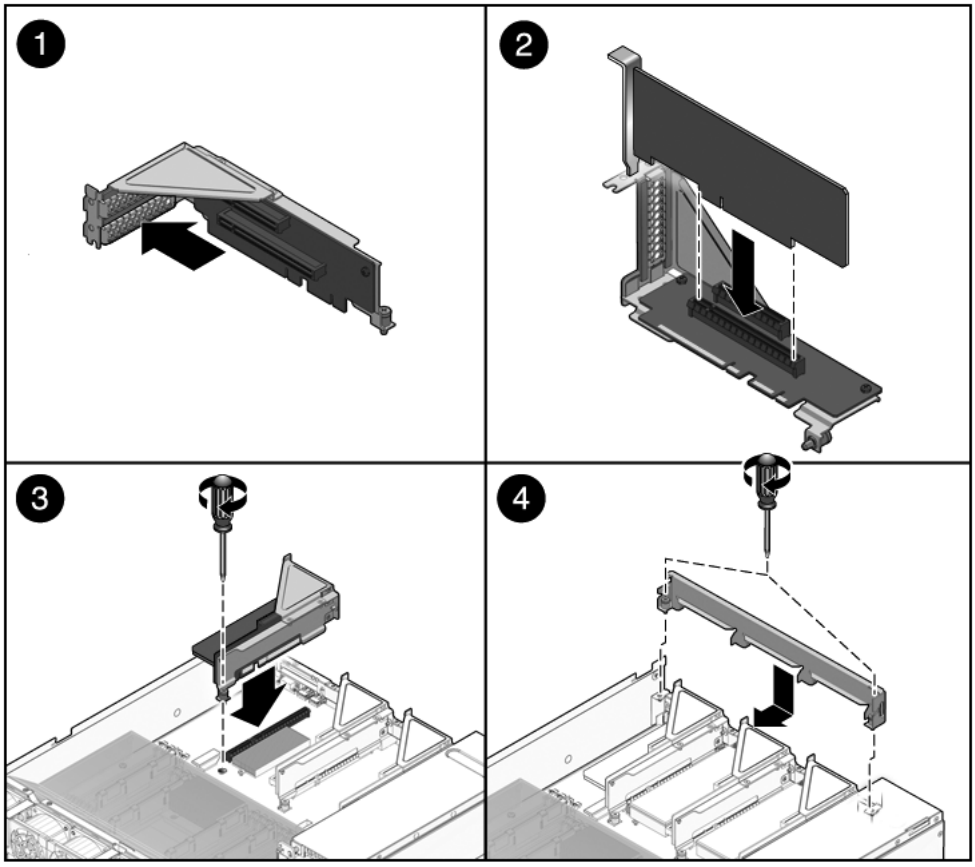
   - Sun SPARC Enterprise T5120 server: PCIe filler panels are located in the removable PCI cross beam. Press the filler panel in from the rear until it snaps into place. (See FIGURE 5-6.)

FIGURE 5-6 Installing a PCIe Card (Sun SPARC Enterprise T5120)



- Sun SPARC Enterprise T5220 server: PCIe filler panels are located on the riser board assembly. Press the filler panel in from the rear until it snaps into place. (See FIGURE 5-7.)

FIGURE 5-7 Installing a PCIe Card (Sun SPARC Enterprise T5220)



6. **Insert the PCIe/XAUI card into the correct slot on the riser board.**
7. **Replace the PCIe/XAUI riser.**
   See Section 5.3.2, "Installing a PCIe/XAUI Riser" on page 5-15.
8. **Install the top cover.**
   See Section 7.1, "Installing the Top Cover" on page 7-2.
9. **Slide the server into the rack.**
   See Section 7.3, "Returning the Server to the Normal Rack Position" on page 7-4.
10. **Connect any data cables required to the PCIe/XAUI card.**
    Route data cables through the cable management arm.

11. **Connect the power supplies.**

    See Section 7.4, “Connecting Power Cords to the Server” on page 7-5.

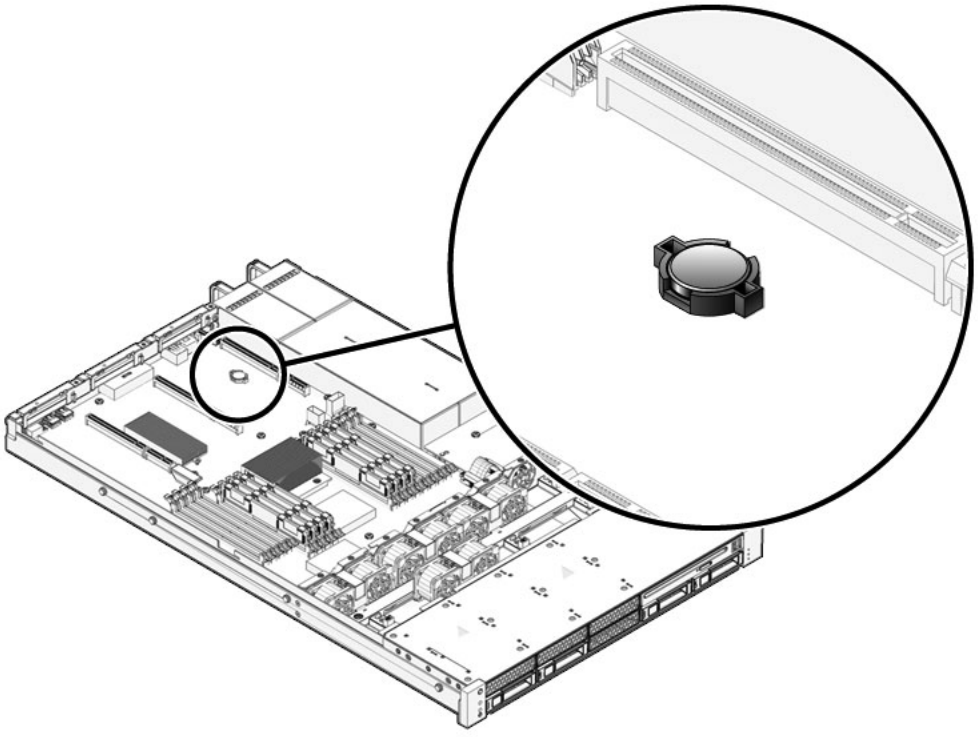
12. **Power on the server.**

    See Section 7.5, “Powering On the Server” on page 7-5.

5.5 Servicing the Battery

The battery maintains system time when the server is powered off and a time server is unavailable. If the server fails to maintain the proper time when powered off and not connected to a network, replace the battery.

FIGURE 5-8 Battery Location (Sun SPARC Enterprise T5120 Server Shown; Sun SPARC Enterprise T5220 Server is Similar.)



5.5.1 Removing the Battery

1. **Remove PCIe/XUAI riser 0**

   See Section 5.3.1, "Removing a PCIe/XAUI Riser" on page 5-13, and Section 5.9, "Reference for PCIe and XAUI Card Configuration" on page 5-35.

2. **Using a small (No. 1 flat-blade) screwdriver, press the latch and remove the battery from the motherboard.**

5.5.2 Installing the Battery

1. **Unpackage the replacement battery.**

2. **Press the new battery into the motherboard.**

   Install the positive side (+) facing upward, away from the motherboard.

3. **Install PCIe/XAUI riser 0.**

   See Section 5.3.2, "Installing a PCIe/XAUI Riser" on page 5-15.

4. **Use the ILOM `setdate` command to set the day and time.**

   See the *Integrated Lights Out Management 2.0 (ILOM 2.0) Supplement for Sun SPARC Enterprise T5120 and T5220 Servers*.

5.6 Servicing the SCC Module

The SCC module contains system host ID, Mac addresses, and configuration variable settings for OpenBoot PROM and ILOM. If you are replacing a motherboard, you must move the SCC module from the old motherboard to the new one.

5.6.1 Removing the SCC Module

1. **Remove the PCIe/XAUI riser 2.**

   See Section 5.3.1, "Removing a PCIe/XAUI Riser" on page 5-13 and Section 5.9, "Reference for PCIe and XAUI Card Configuration" on page 5-35.

2. **Locate the SCC module.**

3. **Pull the SCC module straight up from the connector.**

   SCC module and the SCC connector are keyed.

Note – The server will not function correctly without the SCC module installed.

5.6.2 Installing the SCC Module

1. **Unpackage the replacement SCC module and set it on an antistatic mat.**

2. **Align the SCC module with the its connector on the motherboard.**

Note – The SCC module and its connector are keyed.

---

3. **Press the SCC module down until it seats.**
4. **Install PCIe/XAUI riser 2.**

   See Section 5.3.2, “Installing a PCIe/XAUI Riser” on page 5-15.
5. **Install the top cover.**

   See Section 7.1, “Installing the Top Cover” on page 7-2.
6. **Slide the server into the rack.**

   See Section 7.3, “Returning the Server to the Normal Rack Position” on page 7-4.
7. **Connect the power supplies.**

   See Section 7.4, “Connecting Power Cords to the Server” on page 7-5.
8. **Power on the server.**

   See Section 7.5, “Powering On the Server” on page 7-5.

5.7 Servicing the Motherboard Assembly

The motherboard assembly must be removed in order to access the following components:

- Power distribution board
- Power supply backplane (Sun SPARC Enterprise T5220 server)
- Paddle card

Note – This procedure requires removing the server from the rack.

Caution – The server is heavy. Two persons are required to remove it from the rack.

Caution – This procedure requires that you handle components that are sensitive to electrostatic discharge. This discharge can cause server components to fail. To avoid this problem, ensure that you follow the antistatic practices as described in Section 3.8, “Performing Electrostatic Discharge – Antistatic Prevention Measures” on page 3-11.

5.7.1 Removing the Motherboard Assembly

1. **Power off the server.**

   See Section 3.4, “Powering Off the Server” on page 3-4.

2. **Remove the server from the rack. Place the server on a hard, flat surface.**

   See Section 3.7, “Removing a Server From the Rack” on page 3-8.

3. **Attach an antistatic wrist strap.**

   See Section 3.8, “Performing Electrostatic Discharge – Antistatic Prevention Measures” on page 3-11

4. **Remove the top cover.**

   See Section 3.9, “Removing the Top Cover” on page 3-12.

5. **Remove the air baffle.**

   See Section 5.2.1, “Removing the Air Baffle” on page 5-12.

6. **Remove all PCIe/XAUI riser assemblies.**

   See Section 5.3.1, "Removing a PCIe/XAUI Riser" on page 5-13.

Note – Make note of the location of expansion cards in PCIe/XAUI risers 0 and 1.

---

7. **Disconnect the motherboard to power distribution board ribbon cable.**
8. **Disconnect the hard drive data cables.**
   a. **Push the plug into the connector.**
   b. **Press the release button.**
   c. **Remove the plug from the connector on the hard drive backplane.**

Caution – The hard drive data cables are delicate. Ensure they are safely out of the way when servicing the motherboard.

---

9. **If you are replacing the motherboard, remove the following components:**
   - All FB-DIMMs. Make note of the memory configuration so that you can install the FB-DIMMs in the replacement motherboard.
   - SCC PROM.
10. **Using a No. 2 Phillips screwdriver, remove the four screws that secure the motherboard assembly to the bus bar.**

Note – Set the four screws aside. You must use these screws to attach the motherboard to the bus bar during installation.

---

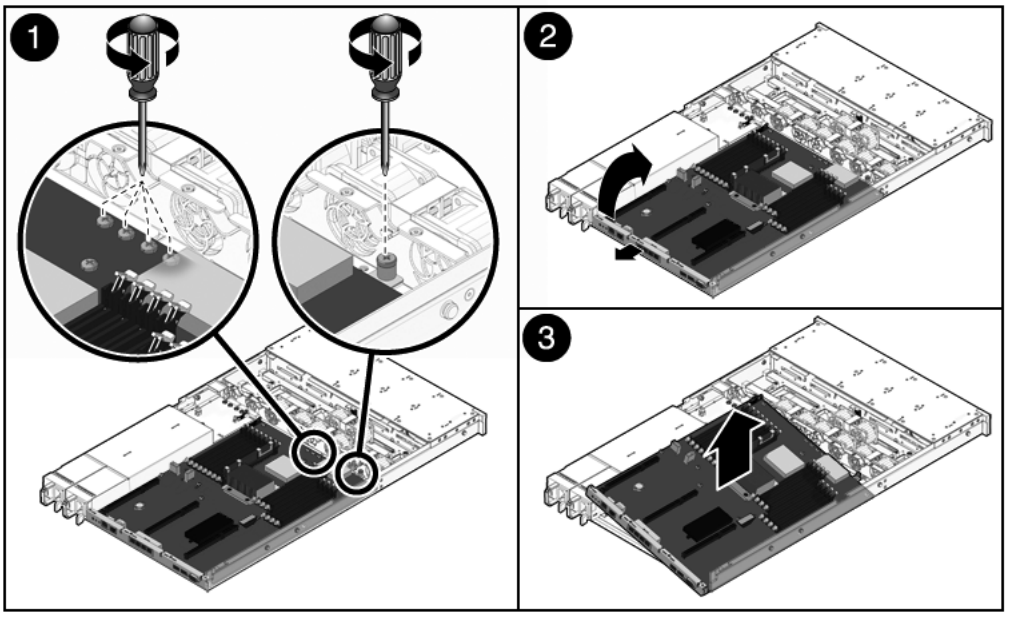
11. **Loosen the captive screw securing the motherboard to the chassis.**

    The captive screw is colored green, and is located to the left of the bus bar screws.
12. **Using the green handle, slide the motherboard back and tilt the motherboard assembly to lift it out of the chassis.**

    Grab the handle and move the motherboard toward the back of the system and lift it out of the chassis.

Caution – Some components on the motherboard might be hot. Use caution when handling the motherboard, especially near the CPU heat sink.

FIGURE 5-9 Removing the Motherboard Assembly (Sun SPARC Enterprise T5120 Server Shown)



13. **Place the motherboard assembly on an antistatic mat.**

5.7.2 Installing the Motherboard Assembly

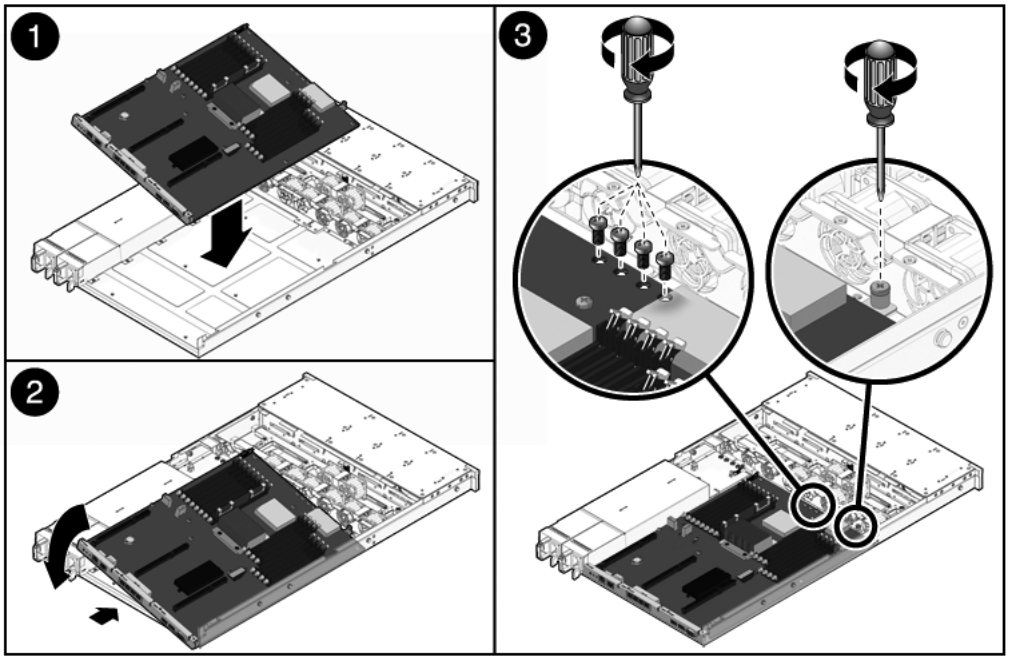
Caution – This procedure requires that you handle components that are sensitive to static discharge. Static discharges can cause the component failures. To avoid this problem, ensure that you follow antistatic practices as described in Section 3.8, "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 3-11.

1. **Tilt the motherboard assembly to position it into the chassis.**

   When you install the motherboard ensure that you position the board as far forward in the chassis as possible.

2. **Position the motherboard so that its screw holes align with the chassis standoffs.**

FIGURE 5-10 Installing the Motherboard Assembly (Sun SPARC Enterprise T5120 Server)



3. **Using the green handle and the back edge of the motherboard tray, push down firmly and equally while sliding the motherboard to the front of the chassis.**

Tip – After installing the motherboard into the chassis, ensure that the motherboard is correctly seated by gently lifting up on the handles. If the board moves upward, then it is not correctly seated. Ensure that the motherboard tray sits flush with the chassis floor. Also, check for binds and ensure that the bus bar screw holes are correctly aligned with the bus bar at the front of the motherboard.

---

4. **Tighten the captive screw that secures the motherboard to the front of its tray in the chassis.**

5. **Install the four #2 Phillips screws that secure the motherboard to the bus bar.**

   The four screws that secure the motherboard to the bus bar are black in color.

Note – When you reinstall the motherboard, you must use the correct screws to attach the motherboard to the bus bar.

---

6. **If you are installing a new motherboard, install the following components:**
   - All FB-DIMMs in the motherboard assembly.

Note – Only install the FB-DIMMs in the slots (connectors) from which they were removed. See Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30.

   - SCC module.

     See Section 5.6.2, "Installing the SCC Module" on page 5-24.

7. **Connect the hard drive data cables.**

   For cable routing, see the following:
   - Sun SPARC Enterprise T5120 Server: FIGURE A-4
   - Sun SPARC Enterprise T5220 Server: FIGURE A-8

8. **Install the air baffle.**

   See Section 5.2.2, "Installing the Air Baffle" on page 5-12.

9. **Reinstall the motherboard to power distribution board ribbon cable.**

10. **Reinstall the PCIe and XUAI risers.**

    See Section 5.3.2, "Installing a PCIe/XAUI Riser" on page 5-15.

11. **Install the top cover.**

    See Section 7.1, "Installing the Top Cover" on page 7-2.

12. **Install the server into the rack.**

    See Section 7.2, "Reinstalling the Server in the Rack" on page 7-3

13. **Attach the power cables.**

    See Section 7.4, "Connecting Power Cords to the Server" on page 7-5.

14. **Power on the server.**

    See Section 7.5, "Powering On the Server" on page 7-5.

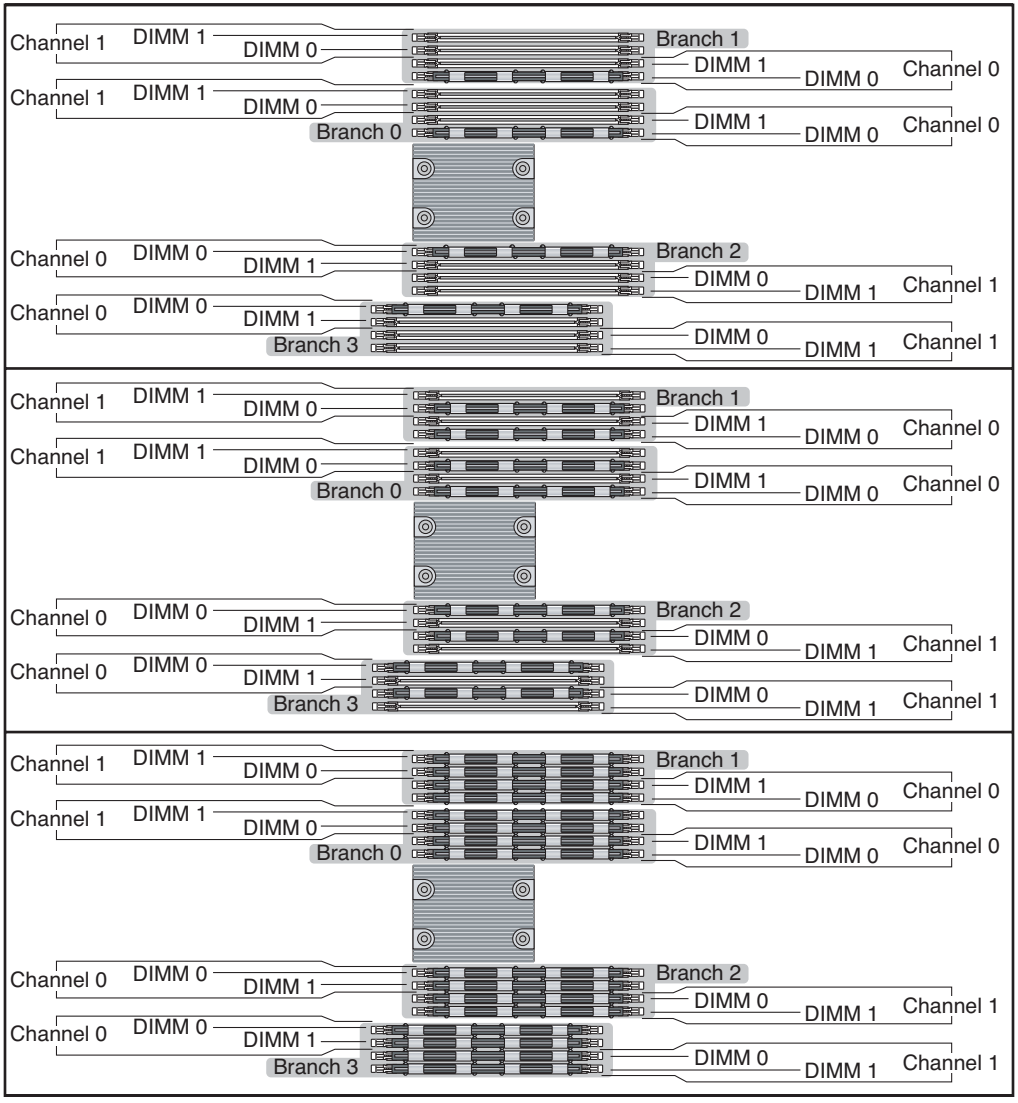
5.8 Reference for FB-DIMM Configuration

Use these FB-DIMM configuration rules, FIGURE 5-11, and TABLE 5-1 to help you plan the memory configuration of your server.

- There are 16 slots that hold industry-standard FB-DIMM memory modules.
- All FB-DIMMs must be the same density (same type)

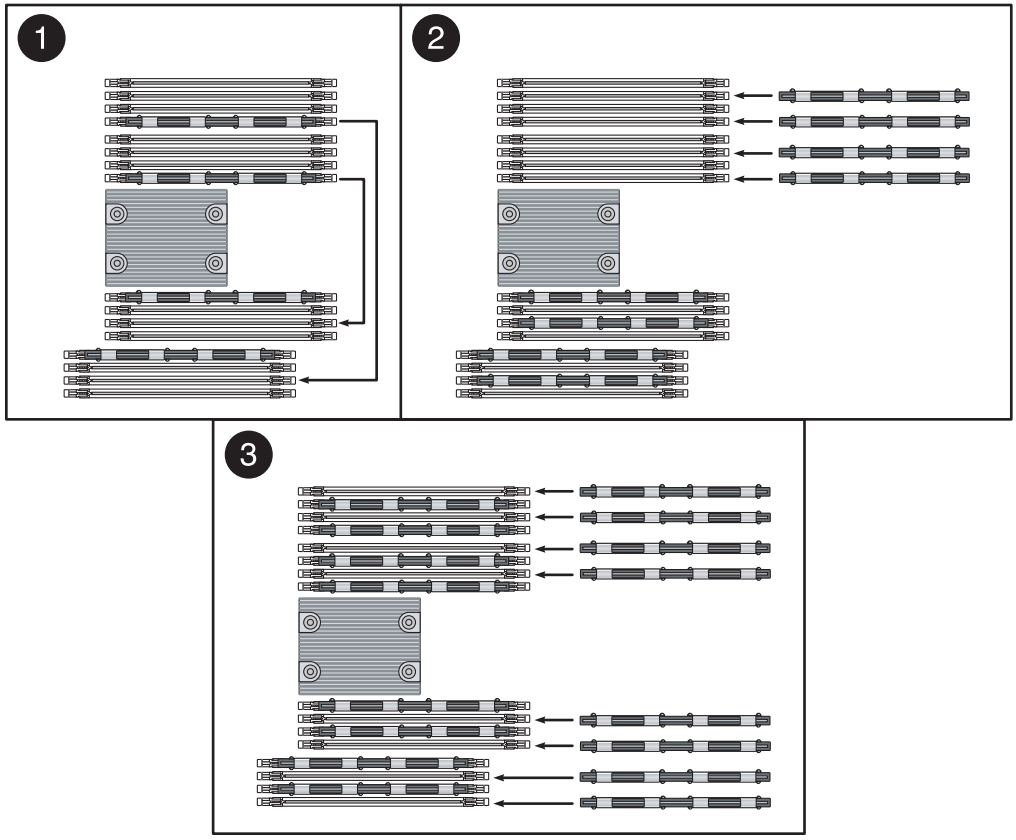
- Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers support the following configurations:
  - 4 FB-DIMMs (Group 1)
  - 8 FB-DIMMs (Groups 1 and 2)
  - 16 FB-DIMMs (Groups 1, 2 and 3) (fully populated configuration)

FIGURE 5-11 FB-DIMM Layout



- At minimum, Channel 0, FB-DIMM Slot 0 in all branches must be populated with FB-DIMMS of the same density (same type).
- In branches populated with more than one FB-DIMM (i.e., in 8 and 16 FB-DIMM configurations), FB-DIMMs are addressed in pairs. Each pair must be identical (same Sun part number).
- Upgrading from a 4 FB-DIMM configuration requires moving two of the FB-DIMMs to ensure matching pairs in all occupied slots. (See FIGURE 5-12)

FIGURE 5-12 FB-DIMM Upgrade Path



- A replacement FB-DIMM must have the same part number as the other FB-DIMM in its pair. For example, a replacement FB-DIMM in J1201 must have the same Sun part number as the FB-DIMM in J1401, in order to ensure an identical pair.
- If you are unable to obtain a matching FB-DIMM, you must replace both FB-DIMMs in the pair.

TABLE 5-1 FB-DIMM Configuration

Branch Name	Channel Name	FRU Name	Motherboard FB-DIMM Connector	FB-DIMM Installation Order*	FB-DIMM Pair\
Branch 0	Channel 0	/SYS/MB/CMP0/BR0/CH0/D0	J1001	1	A
		/SYS/MB/CMP0/BR0/CH0/D1	J1101	3	B
	Channel 1	/SYS/MB/CMP0/BR0/CH1/D0	J1201	2	A
		/SYS/MB/CMP0/BR0/CH1/D1	J1301	3	B
Branch 1	Channel 0	/SYS/MB/CMP0/BR1/CH0/D0	J1401	1	C
		/SYS/MB/CMP0/BR1/CH0/D1	J1501	3	D
	Channel 1	/SYS/MB/CMP0/BR1/CH1/D0	J1601	2	C
		/SYS/MB/CMP0/BR1/CH1/D1	J1701	3	D
Branch 2	Channel 0	/SYS/MB/CMP0/BR2/CH0/D0	J2001	1	E
		/SYS/MB/CMP0/BR2/CH0/D1	J2101	3	F
	Channel 1	/SYS/MB/CMP0/BR2/CH1/D0	J2201	2	E
		/SYS/MB/CMP0/BR2/CH1/D1	J2301	3	F
Branch 3	Channel 0	/SYS/MB/CMP0/BR3/CH0/D0	J2401	1	G
		/SYS/MB/CMP0/BR3/CH0/D1	J2501	3	H
	Channel 1	/SYS/MB/CMP0/BR3/CH1/D0	J2601	2	G
		/SYS/MB/CMP0/BR3/CH1/D1	J2701	3	H

* Upgrade path: DIMMs should be added with each group populated in the order shown.

\ Fault replacement path: Each pair is addressed as a unit, and each pair must be identical.

Note – FB-DIMM names in ILOM messages are displayed with the full FRU name, such as /SYS/MB/CMP0/BR0/CH0/D0.

5.9 Reference for PCIe and XAUI Card Configuration

The PCI expansion system is configured using a variety of riser cards.

5.9.1 Sun SPARC Enterprise T5120 Server PCIe/XAUI Card Configuration Guidelines

TABLE 5-2 describes the physical PCIe/XAUI slot locations on the Sun SPARC Enterprise T5120 server, as viewed from the rear of the system.

TABLE 5-2 Physical PCIe/XAUI Slot Locations (Sun SPARC Enterprise T5120)

PCIe 0/XAUI 0	PCIe 1/XAUI 1	PCIe 2

Use TABLE 5-3 to plan your configuration on the Sun SPARC Enterprise T5120 server.

TABLE 5-3 PCIe and XAUI Support (Sun SPARC Enterprise T5120 Server)

Slot	FRU Name	Device types supported
PCIe 0	/SYS/MB/RISER0/PCIE0	x8 PCIe operating at x4*
PCIe 1	/SYS/MB/RISER1/PCIE1	x8 PCIe operating at x4*
PCIe 2	/SYS/MB/RISER2/PCIE2	x16 PCIe operating at x8
XAUI 0	/SYS/MB/RISER0/XAUI0	XAUI expansion card*
XAUI 1	/SYS/MB/RISER1/XAUI1	XAUI expansion card*

* Slots 0 and 1 are shared PCIe/XAUI slots.

Note – PCIe or XAUI names in ILOM messages are displayed with the full FRU name, such as /SYS/MB/RISER0/PCIE0.

5.9.2 Sun SPARC Enterprise T5220 Server PCIe/XAUI Card Guidelines

TABLE 5-2 describes the physical PCIe/XAUI slot locations on the Sun SPARC Enterprise T5220 server, as viewed from the rear of the system.

TABLE 5-4 Physical PCIe/XAUI Slot Locations (Sun SPARC Enterprise T5220)

PCIe 3	PCIe 4	PCIe 5
PCIe 0/XAUI 0	PCIe 1/XAUI 1	PCIe 2

Use TABLE 5-5 to plan your configuration on the Sun SPARC Enterprise T5220 server.

TABLE 5-5 PCIe and XAUI Support (Sun SPARC Enterprise T5220 Server)

Slot	FRU Name	Device types supported
PCIe 0	/SYS/MB/RISER0/PCIE0	x8 PCIe operating at x4*
PCIe 1	/SYS/MB/RISER1/PCIE1	x8 PCIe operating at x4*
PCIe 2	/SYS/MB/RISER2/PCIE2	x16 PCIe operating at x8
PCIe 3	/SYS/MB/RISER0/PCIE3	x8 PCIe operating at x4
PCIe 4	/SYS/MB/RISER1/PCIE4	x8 PCIe operating at x4
PCIe 5	/SYS/MB/RISER2/PCIE5	x8 PCIe operating at x8
XAUI 0	/SYS/MB/RISER0/XAUI0	XAUI expansion card*
XAUI 1	/SYS/MB/RISER1/XAUI1	XAUI expansion card*

* Slots 0 and 1 are shared PCIe/XAUI slots.

PCIe or XAUI names in ILOM messages are displayed with the full FRU name, such as /SYS/MB/RISER0/PCIE0.

Note – Sun recommends populating the lower PCIe/XAUI slots (Slots 0 - 2) first.

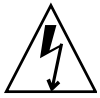
CHAPTER 6

Servicing Infrastructure Boards and Components

This chapter describes how to replace cold-swappable, field-replaceable units (FRUs) in the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers.

The following topics are covered:

- Section 6.1, "Servicing the DVD/USB Module" on page 6-2
- Section 6.2, "Servicing the Fan Power Boards" on page 6-4
- Section 6.3, "Servicing the Hard Drive Cage" on page 6-7
- Section 6.4, "Servicing the Hard Drive Backplane" on page 6-11
- Section 6.5, "Servicing the Front Control Panel Light Pipe Assemblies" on page 6-15
- Section 6.6, "Servicing the Power Distribution Board" on page 6-16
- Section 6.7, "Servicing the Power Supply Backplane for the Sun SPARC Enterprise T5220 Server" on page 6-23
- Section 6.8, "Servicing the Paddle Card" on page 6-26



Caution – You must disconnect both power supplies before servicing any of the components documented in this chapter.

Caution – Never attempt to run the server with the covers removed. Hazardous voltage present.

Caution – Equipment damage possible. The covers must be in place for proper air flow.

6.1 Servicing the DVD/USB Module

The DVD ROM drive and front USB board are mounted in a removable module accessible from the front panel of the system. The DVD/USB module must be removed from the hard drive cage in order to service the hard drive backplane.

6.1.1 Removing the DVD/USB Module

1. **Power off the server.**

   See Section 3.4, "Powering Off the Server" on page 3-4.

2. **Unplug the power cords.**

   See Section 3.5, "Disconnecting Power Cords from the Server" on page 3-6

3. **Attach an antistatic wrist strap.**

   See Section 3.8, "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 3-11.

4. **Remove the following hard drives:**

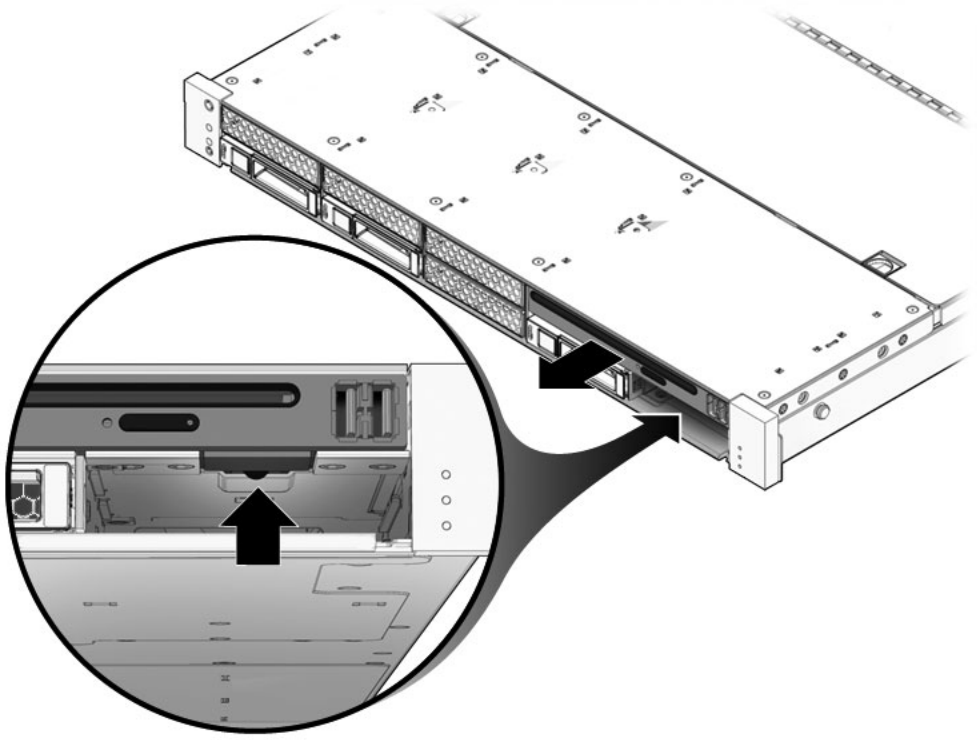
   - Sun SPARC Enterprise T5120 server: HDD3
   - Sun SPARC Enterprise T5220 server: HDD7

   See Section 1.2, "Chassis Overview" on page 1-8 for hard drive locations.

5. **Release the DVD/USB module from the hard drive backplane.**

   Use the finger indent in the hard drive bay below the DVD/USB module to extend the release tab.

FIGURE 6-1 Removing the DVD/USB Module (Sun SPARC Enterprise T5120)

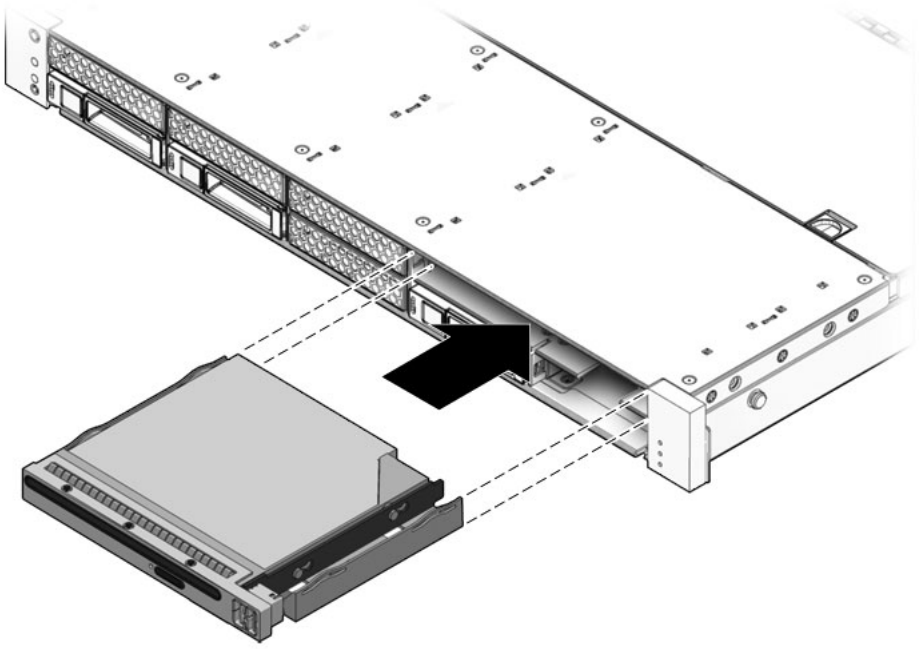


6. **Slide the DVD/USB module out of the hard drive cage.**
7. **Place the module on an antistatic mat.**

6.1.2 Installing the DVD/USB Module

1. **Slide the DVD/USB module into the front of the chassis until it seats.**

FIGURE 6-2 Installing the DVD/USB Module (Sun SPARC Enterprise T5120)



2. **Slide the pull tab back into the system.**
3. **Install the hard drive you removed during the DVD/USB module removal procedure.**
4. **Plug in the power cords.**

   See Section 7.4, "Connecting Power Cords to the Server" on page 7-5.
5. **Power on the server.**

   See Section 7.5, "Powering On the Server" on page 7-5.

6.2 Servicing the Fan Power Boards

You must remove both fan power boards in order to access the paddle card. You must also remove both fan power boards to access the hard drive data cables in the Sun SPARC Enterprise T5220 server.

6.2.1 Removing a Fan Power Board

1. **Power off the server.**

   See Section 3.4, "Powering Off the Server" on page 3-4.

2. **Disconnect the power cables.**

   See Section 3.5, "Disconnecting Power Cords from the Server" on page 3-6

3. **Extend the server into the maintenance position.**

   See Section 3.6, "Extending the Server to the Maintenance Position" on page 3-6.

Note – If you are removing the fan power boards to access the paddle card or hard drive cage, you must remove the server from the rack. See Section 3.7, "Removing a Server From the Rack" on page 3-8.

---

4. **Attach an antistatic wrist strap.**

   See Section 3.8, "Performing Electrostatic Discharge – Antistatic Prevention Measures" on page 3-11.

5. **Remove the top cover.**

   See Section 3.9, "Removing the Top Cover" on page 3-12.

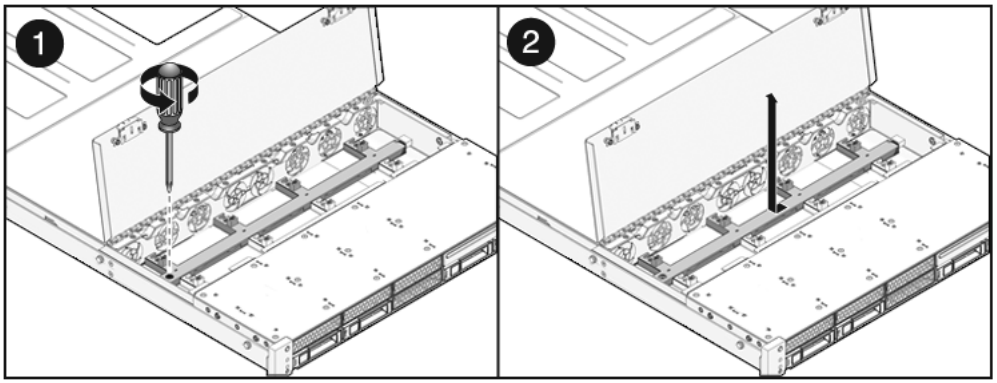
6. **Remove the fan modules.**

Note – If you are replacing a defective fan power board, remove only the fan modules that are necessary to remove the defective fan power board.

   See Section 4.6.1, "Removing a Fan Module" on page 4-13).

7. **Remove the Phillips screw that secures the fan power board to the chassis (**FIGURE 6-3**).**

FIGURE 6-3 Removing the Fan Power Board (Sun SPARC Enterprise T5120)

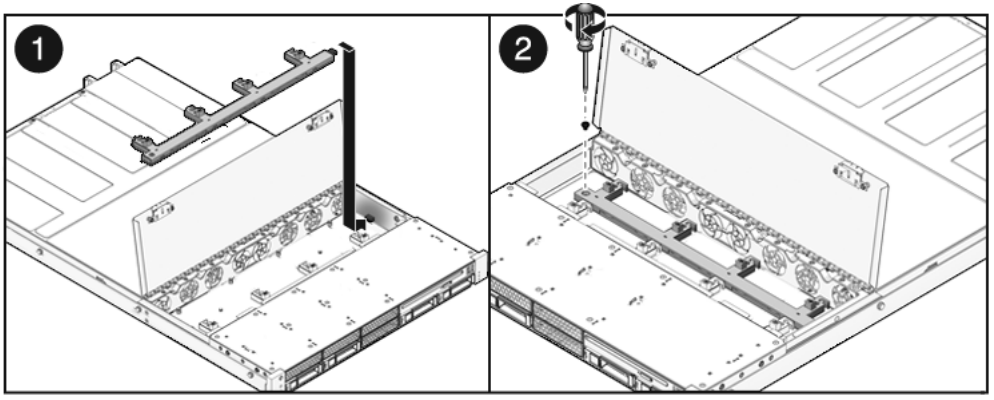


8. **Slide the fan power board to the left to disengage it from the paddle card.**
9. **Remove the fan power board from the system and place it on an antistatic mat.**

6.2.2 Installing a Fan Power Board

1. **Lower the board into its mushroom standoffs in the chassis floor and slide the board to the right into the paddle card.**

FIGURE 6-4 Installing a Fan Power Board (Sun SPARC Enterprise T5120 Server)



2. **Secure the board to the chassis with a Phillips screw.**

3. **Reinstall the fan modules.**

   See Section 4.6.2, “Installing a Fan Module” on page 4-14.

4. **Install the top cover.**

   See Section 7.1, “Installing the Top Cover” on page 7-2.

5. **Slide the server into the rack.**

   See Section 7.3, “Returning the Server to the Normal Rack Position” on page 7-4.

6. **Connect the power cords.**

   See Section 7.4, “Connecting Power Cords to the Server” on page 7-5.

7. **Power on the system.**

   See Section 7.5, “Powering On the Server” on page 7-5.

6.3 Servicing the Hard Drive Cage

You must remove the hard drive cage to access the following components:

- Hard drive backplane
- Front control panel light pipe assemblies

6.3.1 Removing the Hard Drive Cage

1. **Power off the server.**

   See Section 3.4, “Powering Off the Server” on page 3-4.

2. **Disconnect all external cables.**

3. **Remove the server from the rack. Place the server on a hard, flat surface**

   See Section 3.7, “Removing a Server From the Rack” on page 3-8.

4. **(Sun SPARC Enterprise T5120) Remove the inner glides from the server.**

   Each inner glide is secured with a locking tab. Release the tab and slide each inner glide off the server mounting studs.

5. **Attach an antistatic wrist strap.**

   See Section 3.8, “Performing Electrostatic Discharge – Antistatic Prevention Measures” on page 3-11.

6. **Remove the top cover.**

   See Section 3.9, “Removing the Top Cover” on page 3-12.

7. **If you are servicing the hard drive backplane, remove all hard drives.**

   See Section 4.5.1, “Removing a Hard Drive” on page 4-7.

Note – Make a note of the drive locations before removing them from the system. You will need to install the hard drives in the correct locations when reassembling the system.

---

8. **If you are servicing the hard drive backplane, remove the DVD/USB module.**

   See Section 6.1.1, “Removing the DVD/USB Module” on page 6-2.

9. **(Sun SPARC Enterprise T5220 server) Remove the fan modules.**

   See Section 4.6.1, “Removing a Fan Module” on page 4-13.

10. **(Sun SPARC Enterprise T5220 server) Remove the fan power boards.**

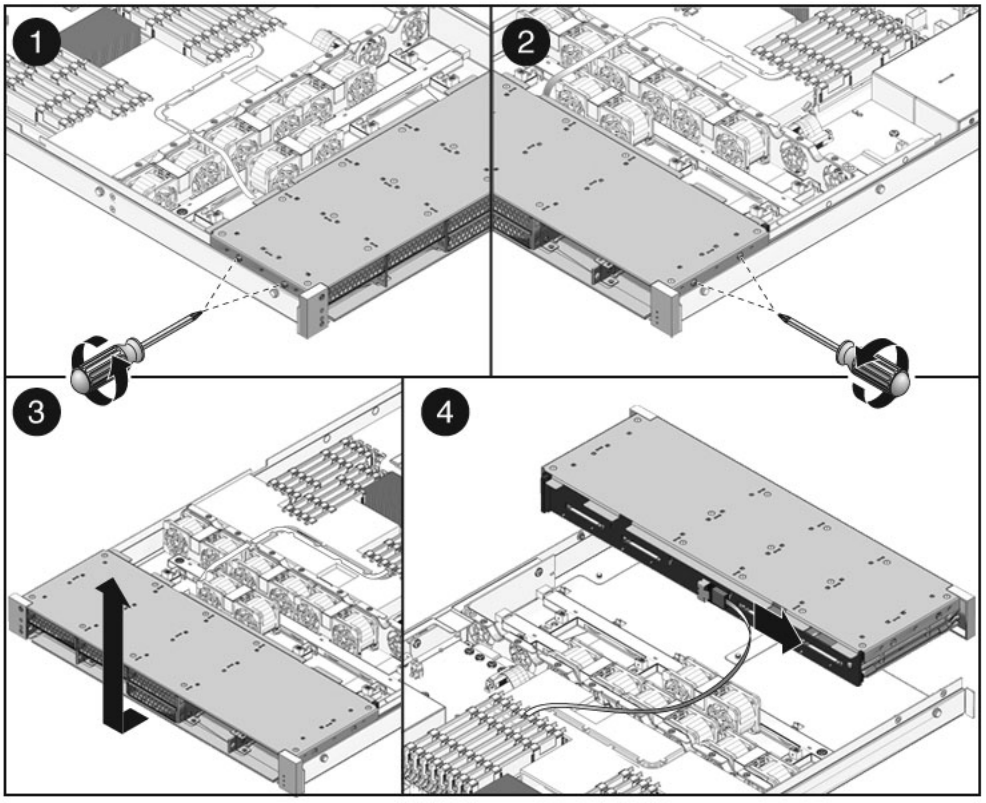
    See Section 6.2.1, “Removing a Fan Power Board” on page 6-5.

11. **Remove the No. 2 Phillips screws securing the hard drive cage to the chassis.**

    Two screws secure the disk cage to each side of the chassis.

12. **Slide the hard drive cage forward to disengage the backplane from the paddle cards.**

FIGURE 6-5 Removing the Hard Drive Cage (Sun SPARC Enterprise T5120 Server)



13. **Disconnect the hard drive data cable(s).**
    a. **Push the plug into the connector.**
    b. **Press the release button.**
    c. **Remove the plug from the connector on the hard drive backplane.**

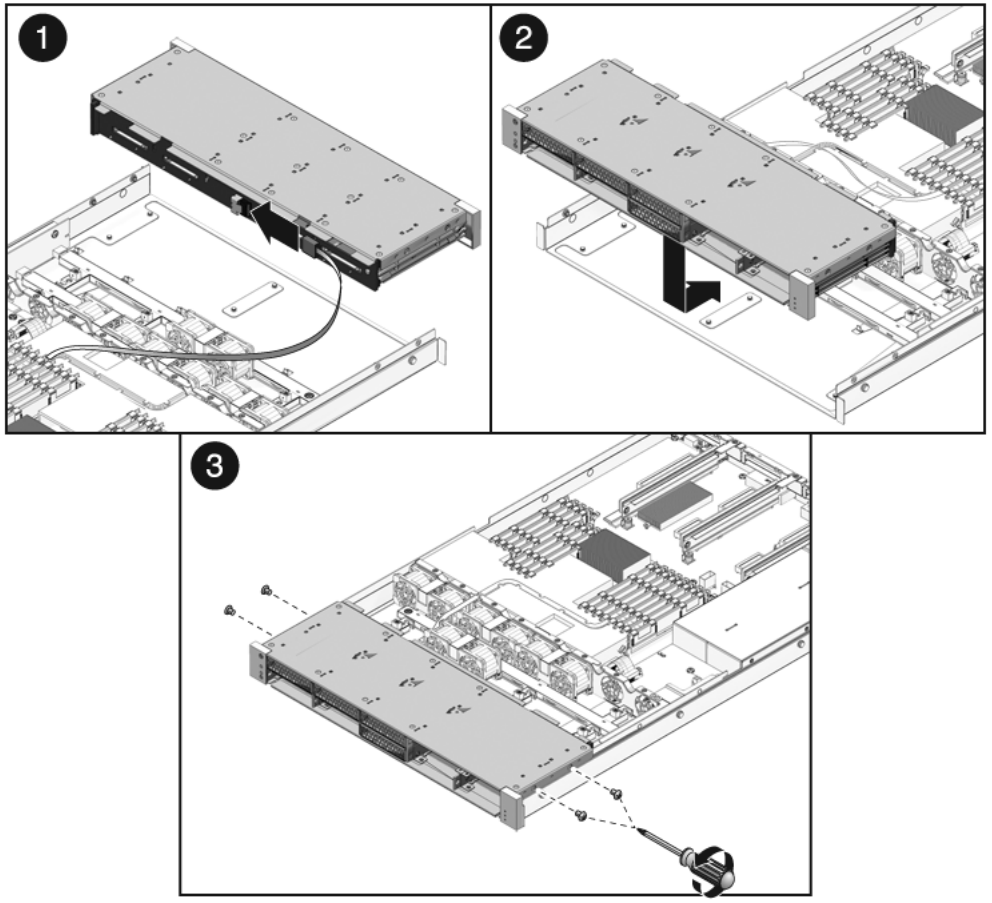
Caution – The hard drive data cables are delicate. Ensure they are safely out of the way when servicing the motherboard.

14. **Lift the hard drive cage up and out of the chassis.**
15. **Set the hard drive cage on an antistatic mat.**

6.3.2 Installing the Hard Drive Cage

1. **Position the hard drive cage in the chassis, over its standoffs.**

FIGURE 6-6 Installing the Hard Drive Cage (Sun SPARC Enterprise T5120 Server)



2. **Note proper cable routing and connections (Sun SPARC Enterprise T5220).**

   FIGURE A-8 depicts proper cable routing.

3. **Connect the hard drive data cable(s).**

   Press the plug into its socket until the plug snaps into place.

4. **Slide the hard drive cage back until the hard drive backplane engages with the paddle card connector.**

5. **Replace the No. 2 Phillips screws securing the hard drive cage to the chassis.**

   Two screws secure the disk cage to each side of the chassis.

6. **(Sun SPARC Enterprise T5220 server) Install the fan power boards.**

   See Section 6.2.2, "Installing a Fan Power Board" on page 6-6.

7. **(Sun SPARC Enterprise T5220 server) Install the fan modules.**

   See Section 4.6.2, "Installing a Fan Module" on page 4-14

8. **Install the top cover.**

   See Section 7.1, "Installing the Top Cover" on page 7-2.

9. **(Sun SPARC Enterprise T5120) Install the inner glides.**

   Slide each inner glide onto the mounting studs on the server until it snaps into place.

10. **(Sun SPARC Enterprise T5120) Install the server into the rack.**

    See Section 7.2, "Reinstalling the Server in the Rack" on page 7-3.

11. **Install the hard drives.**

Note – Ensure you are installing the hard drives in the correct drive bays.

See Section 4.5.2, "Installing a Hard Drive" on page 4-10.

12. **Install the DVD/USB module.**

    See Section 6.1.2, "Installing the DVD/USB Module" on page 6-3.

13. **Attach the power cables.**

    See Section 7.4, "Connecting Power Cords to the Server" on page 7-5.

14. **Power on the system.**

    See Section 7.5, "Powering On the Server" on page 7-5.

6.4 Servicing the Hard Drive Backplane

You must remove the hard drive backplane in order to service the front control panel light pipe assemblies.

6.4.1 Removing the Hard Drive Backplane

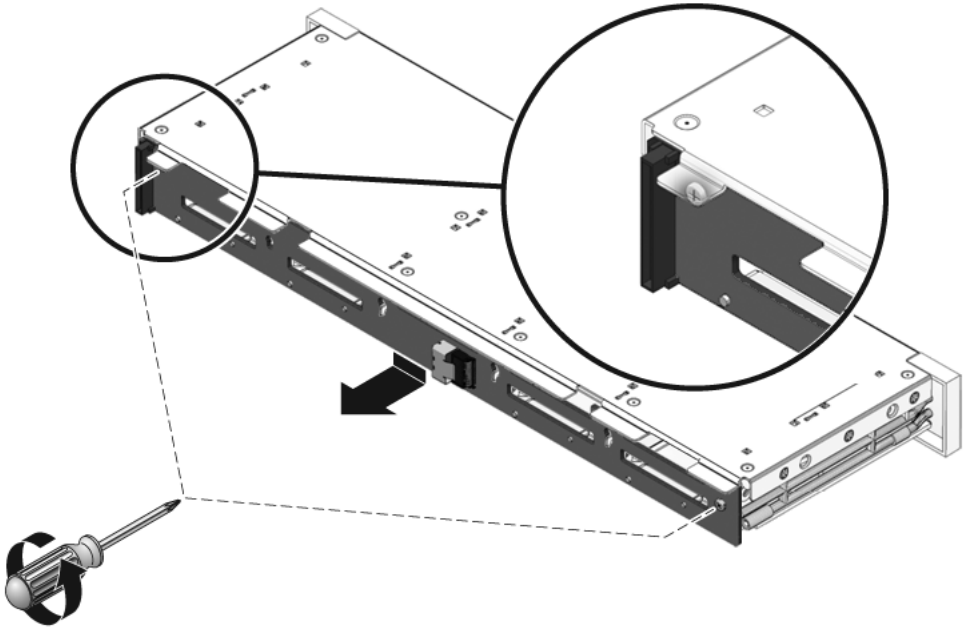
1. **Remove the hard drive cage.**

   See Section 6.3.1, "Removing the Hard Drive Cage" on page 6-7

2. **Remove the No. 2 Phillips screws securing the backplane to the hard drive cage.**

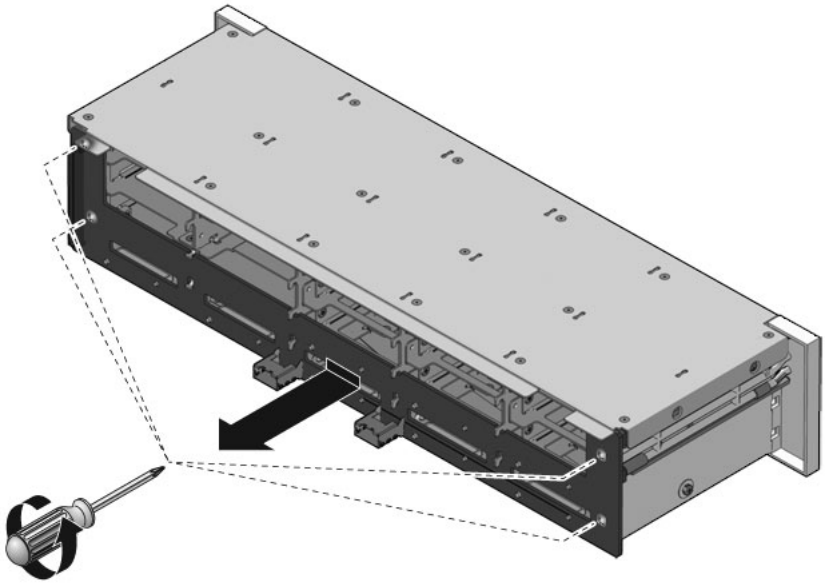
   - Two screws secure the backplane in the Sun SPARC Enterprise T5120 server (see FIGURE 6-7).

FIGURE 6-7 Removing the Hard Drive Backplane (Sun SPARC Enterprise T5120 server)



   - Four screws secure the backplane in the Sun SPARC Enterprise T5220 server (see FIGURE 6-8).

FIGURE 6-8 Removing the Hard Drive Backplane (Sun SPARC Enterprise T5220 server)

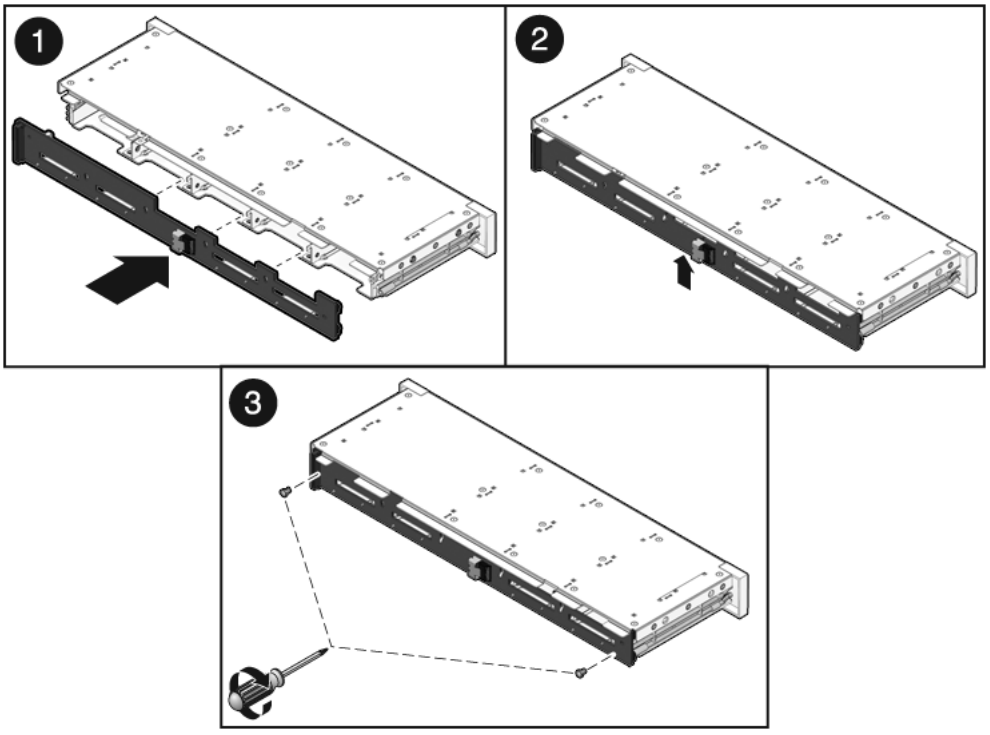


3. **Slide the backplane down and off the hard drive cage retention hooks.**
4. **Place the hard drive backplane on an antistatic mat.**

6.4.2 Installing the Hard Drive Backplane

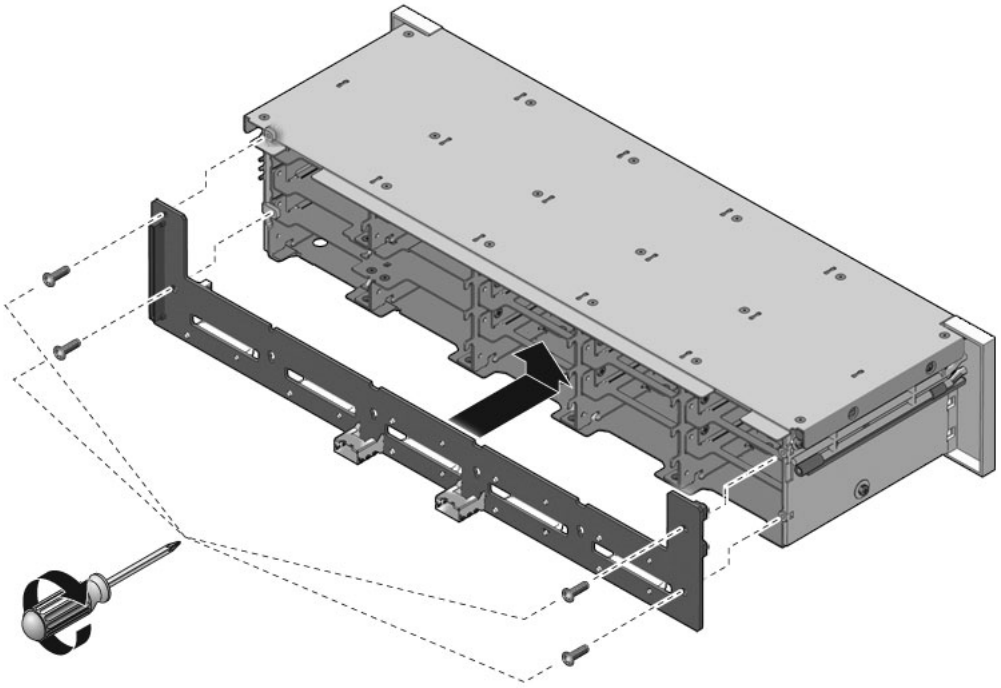
1. **Slide the backplane under the retention hooks on the hard drive cage.**
2. **Install the No. 2 Phillips screws which secure the backplane to the hard drive cage.**
   - Two screws secure the backplane in the Sun SPARC Enterprise T5120 server.

FIGURE 6-9 Installing the Hard Drive Backplane (Sun SPARC Enterprise T5120 server)



- Four screws secure the backplane in the Sun SPARC Enterprise T5220 server.

FIGURE 6-10 Installing the Hard Drive Backplane (Sun SPARC Enterprise T5220 Server)



3. **Install the hard drive cage.**

   See Section 6.3.2, "Installing the Hard Drive Cage" on page 6-10.

6.5 Servicing the Front Control Panel Light Pipe Assemblies

6.5.1 Removing the Front Control Panel Light Pipe Assemblies

1. **Remove the hard drive cage.**

   See Section 6.3.1, "Removing the Hard Drive Cage" on page 6-7.

2. **Remove the No. 2 Phillips screw securing the front control panel light pipe assembly to the hard drive cage.**
3. **Side the light pipe assembly out of the hard drive cage.**

6.5.2 Installing the Front Control Panel Light Pipe Assembly

1. **Align the light pipe assembly with the mounting holes on the hard drive cage.**
2. **Secure the light pipe assembly with a No. 2 Phillips screw.**
3. **Install the hard drive cage.**

   See Section 6.3.2, "Installing the Hard Drive Cage" on page 6-10.

6.6 Servicing the Power Distribution Board

It is easier to service the power distribution board (PDB) with the bus bar assembly attached. If you are replacing a faulty PDB, you must remove the bus bar assembly from the old board and attach it to the new PDB. In addition, you must reprogram the replacement power distribution board with the chassis serial number.

You must remove the power distribution board to access the paddle card.

Caution – The system supplies power to the power distribution board even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before servicing the power distribution board.

Note – If you are replacing a faulty power distribution board, you must run the ALOM-CMT `setcsn` command to electronically input the chassis serial number after reassembling the system.

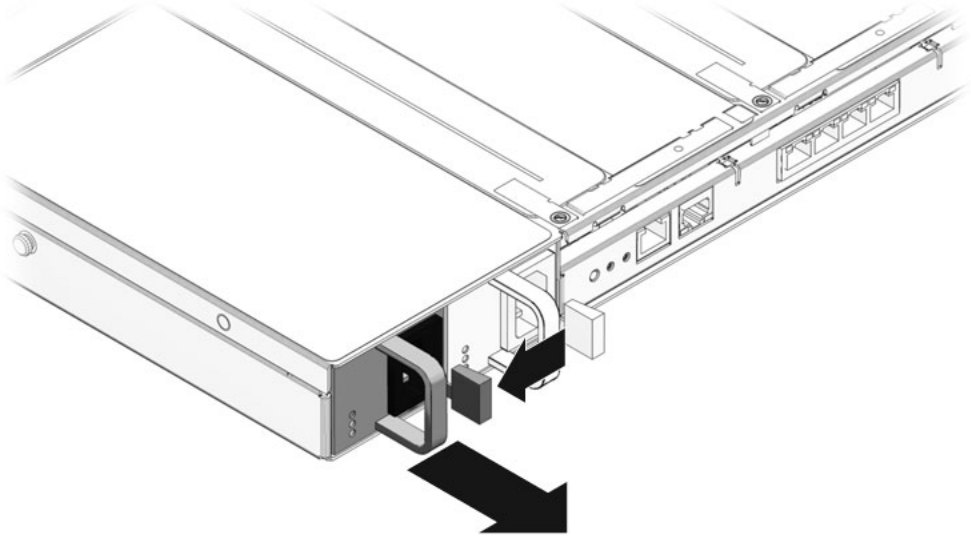
6.6.1 Removing the Power Distribution Board

1. **Note the chassis serial number.**

   The serial number is printed on a label affixed to the side of the chassis.

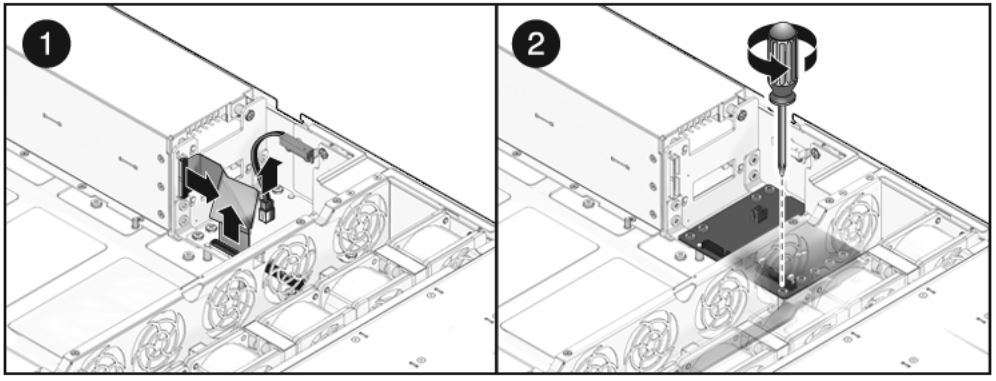
2. **Remove the motherboard assembly.**
   See Section 5.7.1, "Removing the Motherboard Assembly" on page 5-26
3. **(Sun SPARC Enterprise T5120 server) Remove all power supplies.**
   a. **Grasp the power supply handle and press the release latch.**
   b. **Slide the power supply out of the system.**

FIGURE 6-11 Removing a Power Supply (Sun SPARC Enterprise T5120 Server)



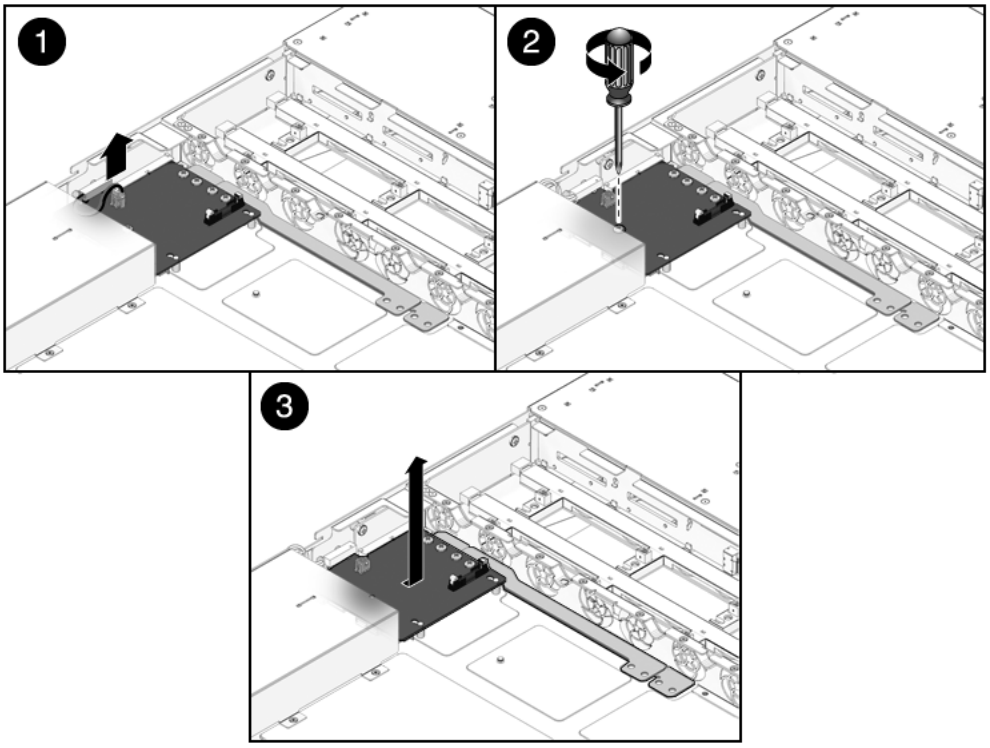
4. **Disconnect the top cover interlock cable from the power distribution board.**
5. **(Sun SPARC Enterprise T5220 server) Disconnect the ribbon cable between the PDB and the power supply backplane.**

FIGURE 6-12 Removing the Power Distribution Board (Sun SPARC Enterprise T5220)



6. **(Sun SPARC Enterprise T5220) Remove the four No. 2 Phillips screws securing the PDB to the power supply backplane.**
7. **Remove the No. 2 Phillips screw securing the PDB to the chassis.**

FIGURE 6-13 Removing the Power Distribution Board (Sun SPARC Enterprise T5120 Server)



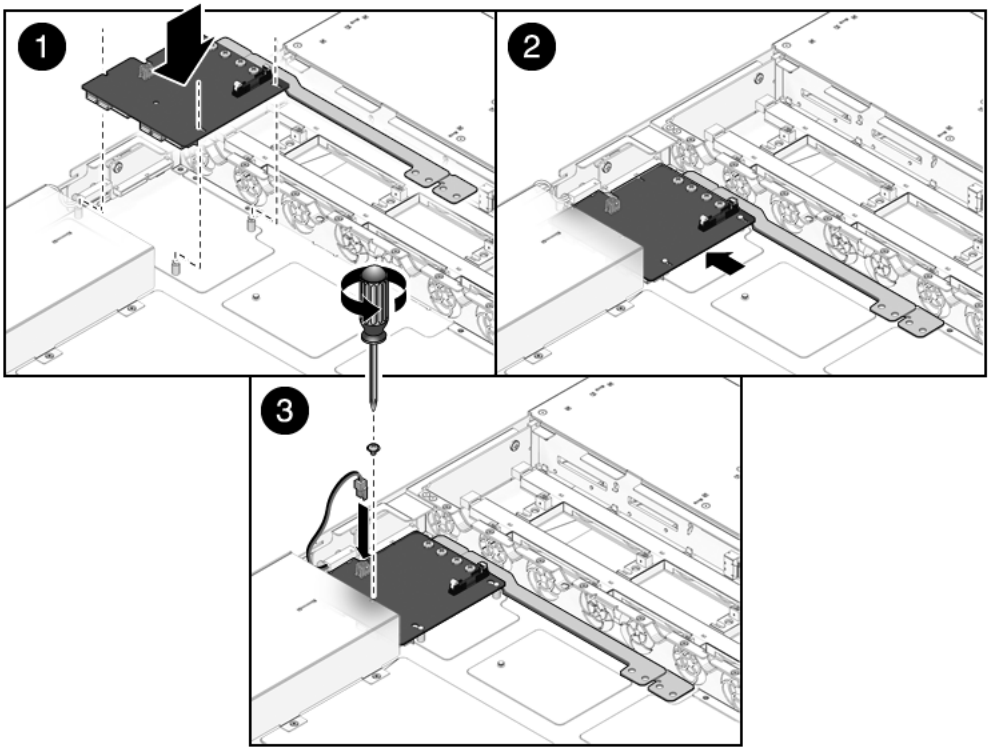
8. **Grasp the bus bar and pull the PDB/bus bar assembly to the left, away from the paddle card.**
9. **Lift the PDB/bus bar assembly up and out of the system.**
10. **Place the PDB/bus bar assembly on an antistatic mat.**

6.6.2 Installing the Power Distribution Board

1. **Lower the PDB/bus bar assembly into the chassis.**

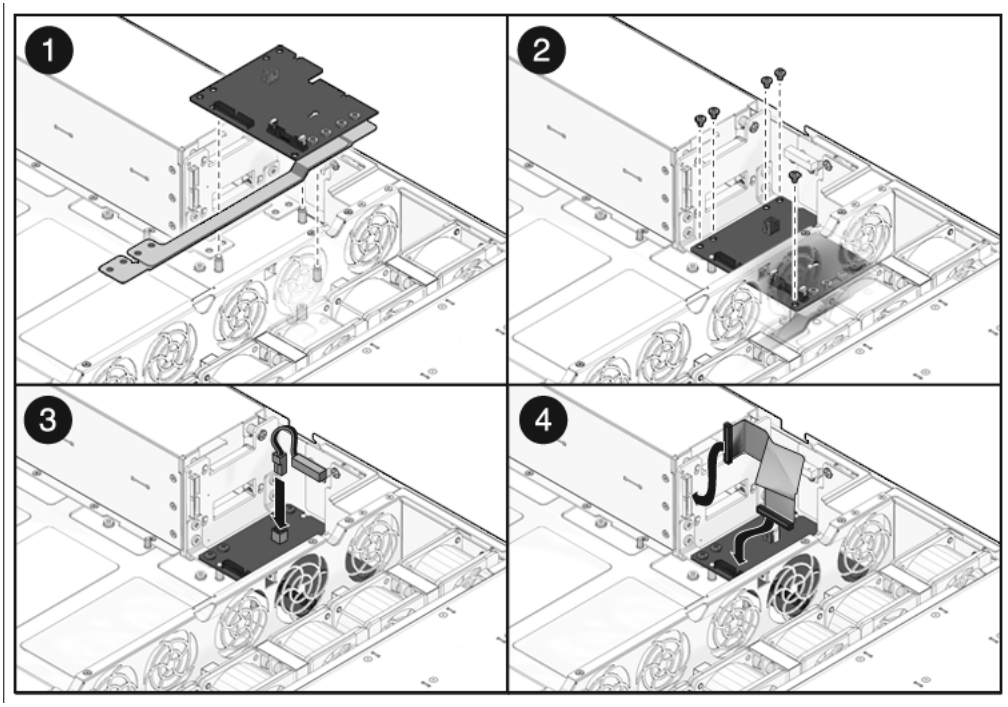
   The PDB fits over a series of mushroom standoffs in the floor of the chassis.
2. **Slide the PDB/bus bar assembly to the right, until it plugs into the paddle card.**

FIGURE 6-14 Installing the Power Distribution Board (Sun SPARC Enterprise T5120 server)



3. **Install the No. 2 Phillips screw to secure the PDB to the chassis.**
4. **(Sun SPARC Enterprise T5220 server) Attach the four No. 2 Philips screws securing the PDB to the power supply backplane.**

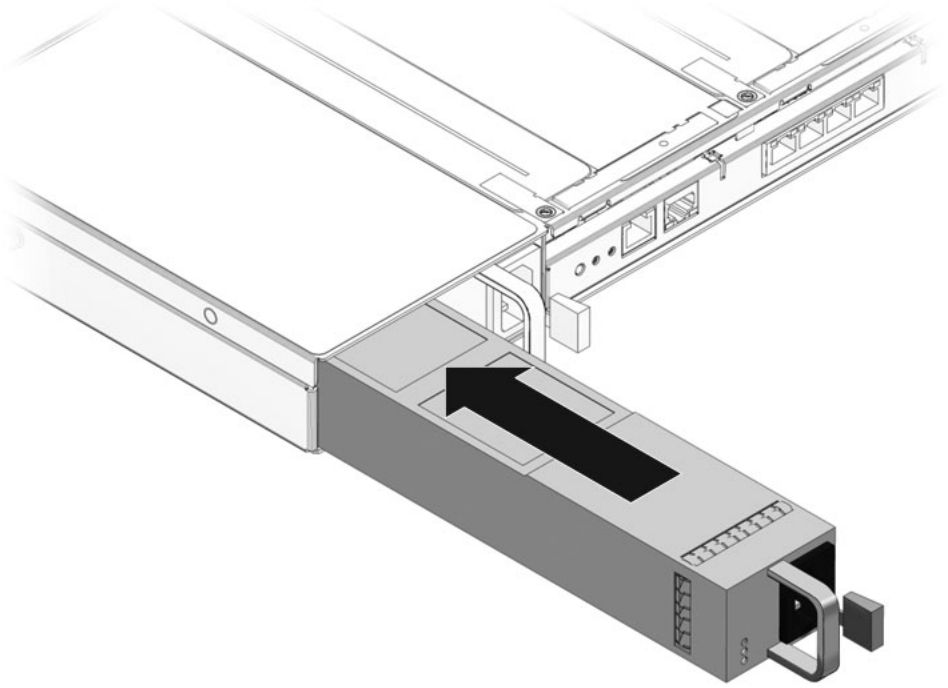
FIGURE 6-15 Installing the Power Distribution Board (Sun SPARC Enterprise T5220 server)



5. **(Sun SPARC Enterprise T5220 server) Connect the power supply backplane ribbon cable to its plug on the PDB.**
6. **Connect the top cover interlock cable to the power distribution board.**
7. **(Sun SPARC Enterprise T5120 server) Install the power supplies.**

   Slide each power supply into its bay until it locks into place.

FIGURE 6-16 Installing a power supply (Sun SPARC Enterprise T5120 server)



8. **Install the motherboard assembly.**

   See Section 5.7.2, "Installing the Motherboard Assembly" on page 5-28.

Note – After replacing the power distribution board and powering on the system, you must run the `setcsn` command on the ALOM CMT console to set the electronically readable chassis serial number. The following steps describe how to do this.

---

9. **Gain access to the ALOM CMT `sc>` prompt.**

10. **Perform the following service commands to set the electronic chassis serial number in the power distribution board:**

Caution – Once the power distribution board is programmed with an electronic chassis serial number, the serial number cannot be changed. When executing the following commands, ensure that you run the commands correctly and that you enter the correct chassis serial number because you will not be able to change it. The chassis serial number is used to obtain product support.

```
sc> setsc sc_servicemode true
Warning: misuse of this mode may invalidate your warranty.
sc> setcsn -c chassis_serial_number
Are you sure you want to permanently set the Chassis Serial Number
to chassis_serial_number [y/n]? y
Chassis serial number recorded.
sc> showplatform
SUNW,Sun-Fire-T5120
Chassis Serial Number: chassis-serial-number
Domain Status
------ ------
S0 Running
sc>setsc sc_servicemode false
```

6.7 Servicing the Power Supply Backplane for the Sun SPARC Enterprise T5220 Server

In the Sun SPARC Enterprise T5220 server, the power supply backplane carries 12V power to the power distribution board.

Caution – The system supplies power to the power supply backplane even when the server is powered off. To avoid personal injury or damage to the server, you must disconnect power cords before servicing the power supply backplane.

6.7.1 Removing the Power Supply Backplane

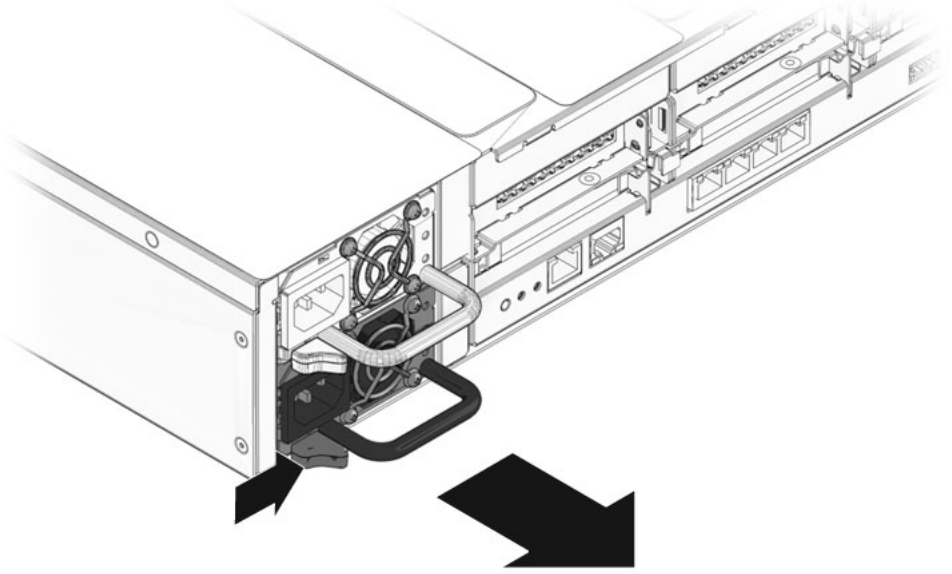
1. **Remove the motherboard assembly.**

   See Section 5.7.1, "Removing the Motherboard Assembly" on page 5-26.

2. **Remove all power supplies.**

   Grasp the power supply handle and press the release latch.

FIGURE 6-17 Removing a Power Supply (Sun SPARC Enterprise T5220 server)



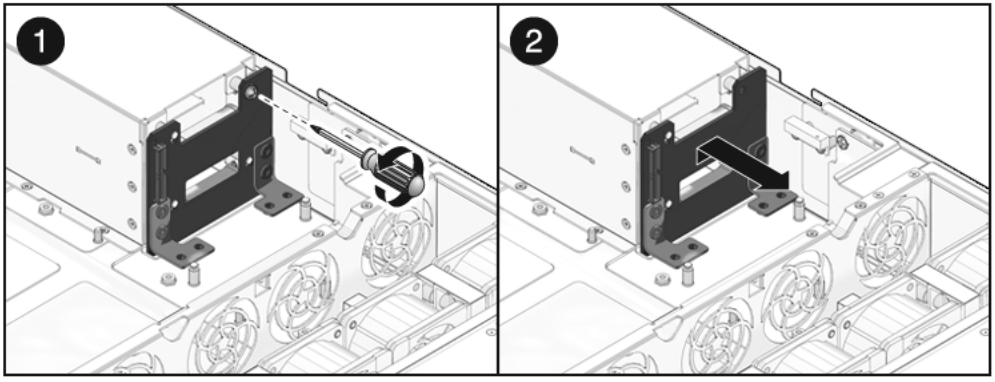
3. **Remove the power distribution board.**

   See Section 6.6.1, "Removing the Power Distribution Board" on page 6-16.

4. **Remove the No. 2 Phillips screw securing the power supply backplane to the power supply bay.**

5. **Lift the power supply backplane up and off its mushroom standoffs, and out of the system.**

FIGURE 6-18 Removing the Power Supply Backplane (Sun SPARC Enterprise T5220 server)



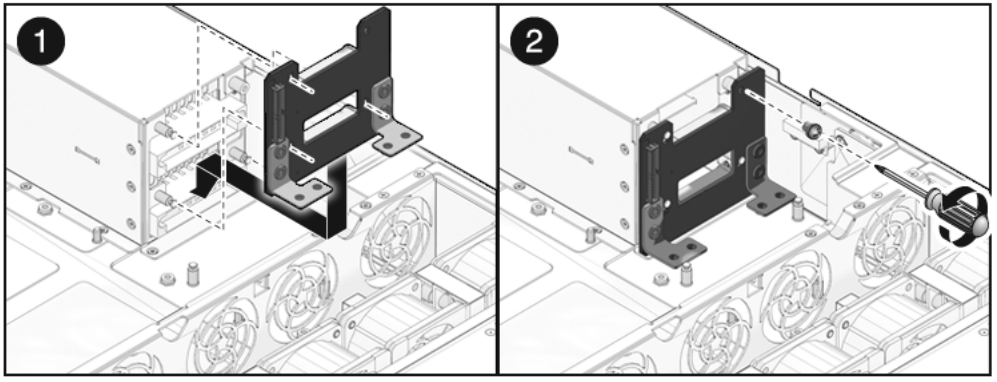
6. **Place the power supply backplane on an antistatic mat.**

6.7.2 Installing the Power Supply Backplane

1. **Mount the power supply backplane to the front of the power supply bay.**

   Place the backplane over its mushroom standoffs and press down toward the floor of the chassis.

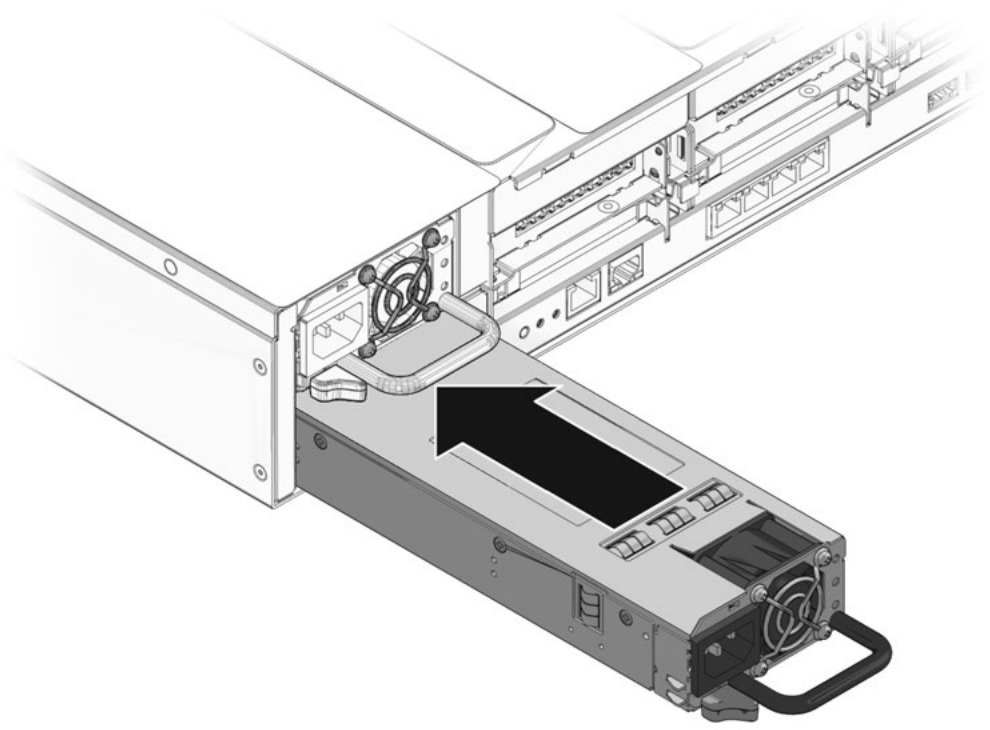
FIGURE 6-19 Installing the Power Supply Backplane (Sun SPARC Enterprise T5220 server)



2. **Secure the power supply backplane with one No. 2 Phillips screw.**

3. **Install the power distribution board.**
   See Section 6.6.2, “Installing the Power Distribution Board” on page 6-19.
4. **Install all power supplies.**
   Slide each power supply into its bay until it locks into place.

FIGURE 6-20 Installing a Power Supply (Sun SPARC Enterprise T5220 server)



5. **Install the motherboard assembly.**
   Section 5.7.2, “Installing the Motherboard Assembly” on page 5-28.

6.8 Servicing the Paddle Card

The paddle card assembly includes the top cover interlock switch.

6.8.1 Removing the Paddle Card

1. **Remove the motherboard assembly.**

   See Section 5.7.1, “Removing the Motherboard Assembly” on page 5-26.

2. **Remove the power distribution board.**

   See Section 6.6.1, “Removing the Power Distribution Board” on page 6-16.

3. **Remove the fan power boards.**

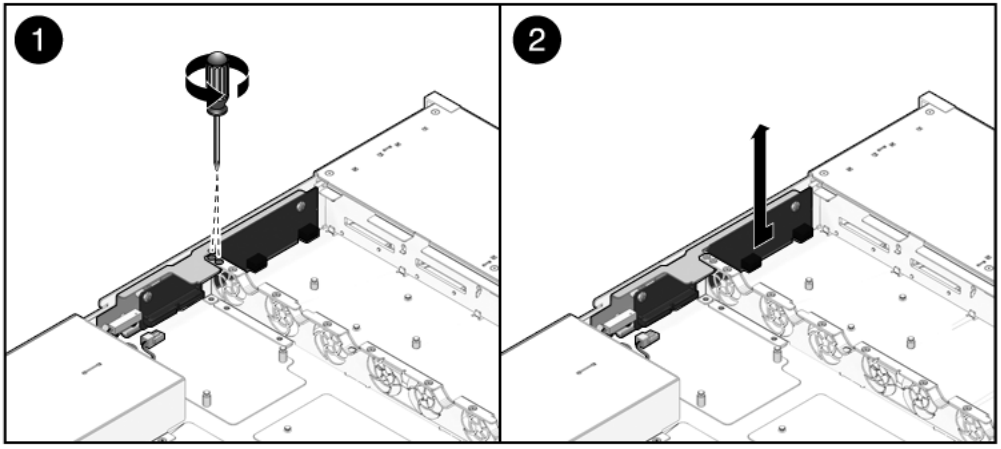
   See Section 6.2.1, “Removing a Fan Power Board” on page 6-5

4. **Remove the two No. 2 Phillips screws securing the paddle card to the chassis.**

5. **Slide the paddle card back, away from its connector on the hard drive backplane.**

6. **Tilt the paddle card away from the side of the chassis and lift it up and out of the system.**

FIGURE 6-21 Removing the Paddle Card (Sun SPARC Enterprise T5120 Server)



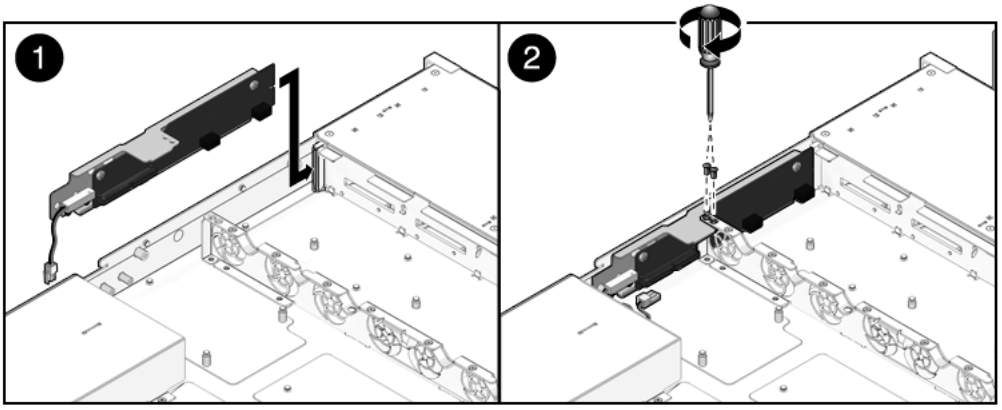
7. **Lift the paddle card up and out of the chassis.**

8. **Place the paddle card on an antistatic mat.**

6.8.2 Installing the Paddle Card

1. **Lower the paddle card into the chassis.**
   The paddle card fits over a series of mushroom standoffs in the chassis side wall.
2. **Slide the paddle card forward to plug it into the hard drive backplane.**

FIGURE 6-22 Installing the Paddle Card (Sun SPARC Enterprise T5120 Server)



3. **Secure the paddle card with two No. 2 Phillips screws.**
4. **Install the fan power boards.**
   See Section 6.2.2, “Installing a Fan Power Board” on page 6-6.
5. **Install the power distribution board.**
   See Section 6.6.2, “Installing the Power Distribution Board” on page 6-19.
6. **Install the motherboard assembly.**
   See Section 5.7.2, “Installing the Motherboard Assembly” on page 5-28.

CHAPTER 7

Returning the Server to Operation

This chapter describes how to return the Sun SPARC Enterprise T5120 and Sun SPARC Enterprise T5220 servers to operation after you have performed service procedures.

The following topics are covered:

- Section 7.1, "Installing the Top Cover" on page 7-2
- Section 7.2, "Reinstalling the Server in the Rack" on page 7-3
- Section 7.3, "Returning the Server to the Normal Rack Position" on page 7-4
- Section 7.4, "Connecting Power Cords to the Server" on page 7-5
- Section 7.5, "Powering On the Server" on page 7-5

Note – Never attempt to run the server with the covers removed. Hazardous voltage present.

Caution – Equipment damage possible. The covers must be in place for proper air flow.

7.1 Installing the Top Cover

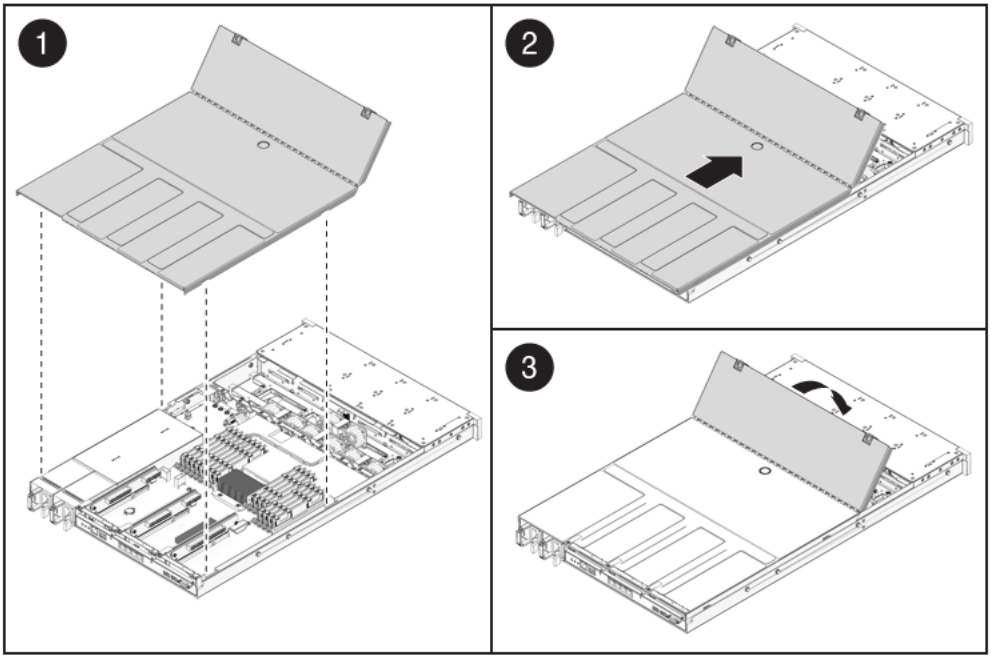
If you removed the top cover, perform these steps:

1. **Place the top cover on the chassis.**

   Set the cover down so that it hangs over the rear of the server by about an inch (25.4 mm).

2. **Slide the top cover forward until it seats (**FIGURE 7-1**).**

FIGURE 7-1 Installing the Top Cover



Note – If removing the top cover caused an emergency shutdown, you must install the top cover and use the `poweron` command to restart the system. See Section 7.5, "Powering On the Server" on page 7-5.

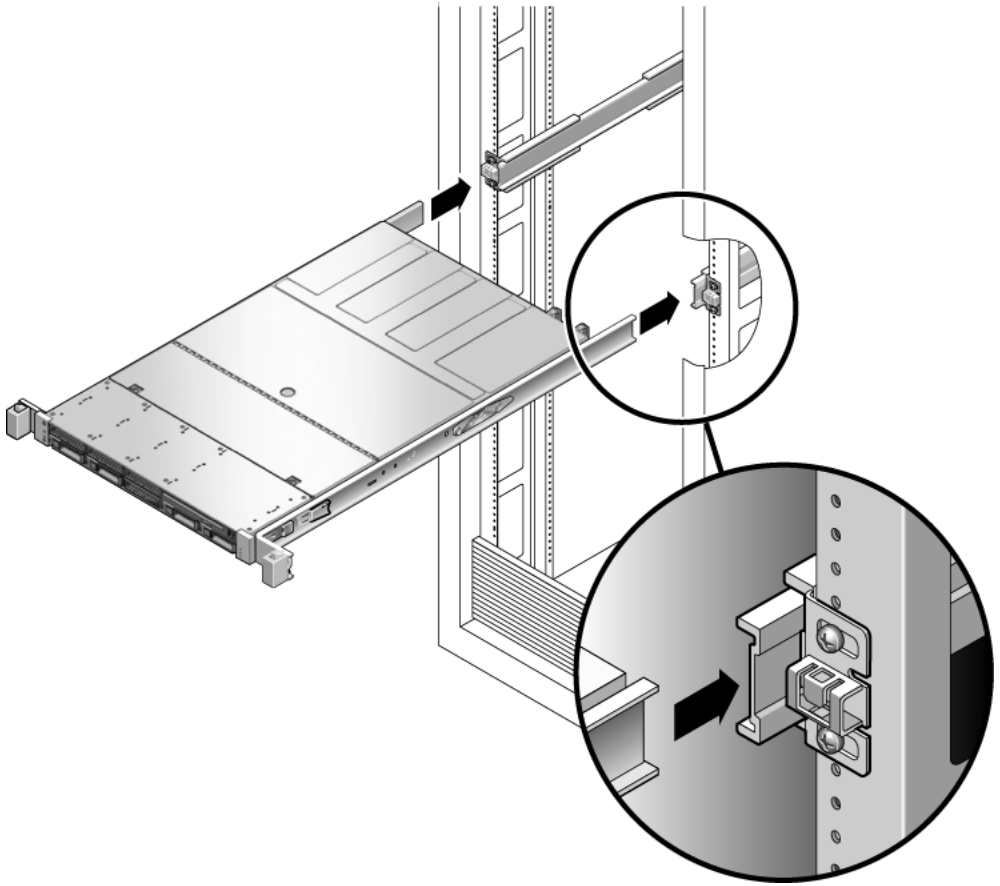
7.2 Reinstalling the Server in the Rack

If you removed the server chassis from the rack, perform these steps.

Caution – The servers are heavy. Two people might be required to carry the chassis and install it in the rack.

1. **Place the ends of the chassis mounting brackets into the slide rails (**FIGURE 7-2**).**

FIGURE 7-2 Returning the Server to the Rack (Sun SPARC Enterprise T5120 Server)



2. **Slide the server into the rack until the brackets lock into place.**

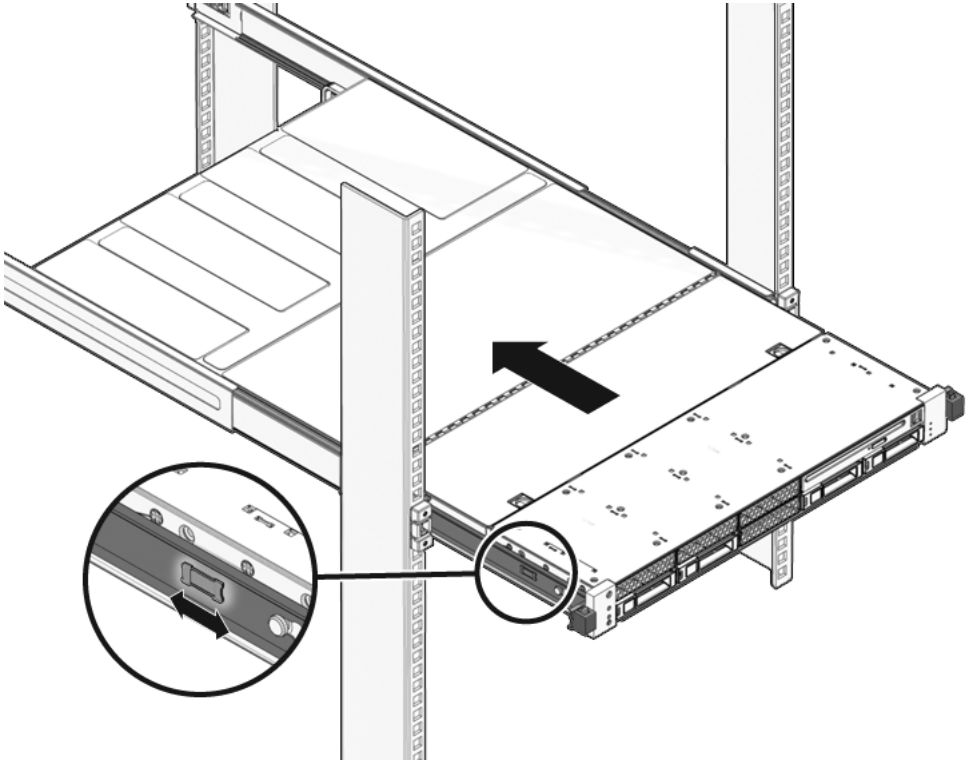
   The server is now in the extended maintenance position.

7.3 Returning the Server to the Normal Rack Position

If you extended the server to the maintenance position, use this procedure to return the server to the normal rack position.

1. **Release the slide rails from the fully extended position by pushing the release tabs on the side of each rail (**FIGURE 7-3**).**

FIGURE 7-3 Release Tabs – Rail



2. **While pushing on the release tabs, slowly push the server into the rack.**

   Ensure that the cables do not get in the way.

3. **Reconnect the cables to the back of the server.**

   If the CMA is in the way, disconnect the left CMA release and swing the CMA open.

4. **Reconnect the CMA.**

   Swing the CMA closed and latch it to the left rack rail.

7.4 Connecting Power Cords to the Server

- **Reconnect both power cords to the power supplies.**

Note – As soon as the power cords are connected, standby power is applied, and depending on the configuration of the firmware, the system might boot. See the *Sun SPARC Enterprise T5120 and T5220 Servers Adminstration Guide* for configuration and power-on information.

7.5 Powering On the Server

To power on the system, do one of the following:

- To initiate the power-on sequence from the service processor prompt, issue the `poweron` command.

  You will see an `-> Alert` message on the system console. This indicates that the system is reset. You will also see a message indicating that the VCORE has been margined up to the value specified in the *default.scr* file which was previously configured.

  Example.

```
sc> poweron
```

- To initiate the power-on sequence manually, use a pen or pencil to press the Power button on the front panel. See Section 1.3, "About the Front Panel" on page 1-10 for Power button location.

Note – If you are powering on the server following an emergency shutdown triggered by the top cover interlock switch, you must use the `poweron` command.

APPENDIX **A**

Field-Replacable Units

The following illustrations provide exploded views of system components. Use these illustrations, and the accompanying tables, to identify parts in your system.

This appendix contains the following sections:

- Section A.1, "Sun SPARC Enterprise T5120 Server" on page A-2
- Section A.2, "Sun SPARC Enterprise T5220 Server" on page A-10

A.1 Sun SPARC Enterprise T5120 Server

FIGURE A-1 I/O Components (Sun SPARC Enterprise T5120 Server)

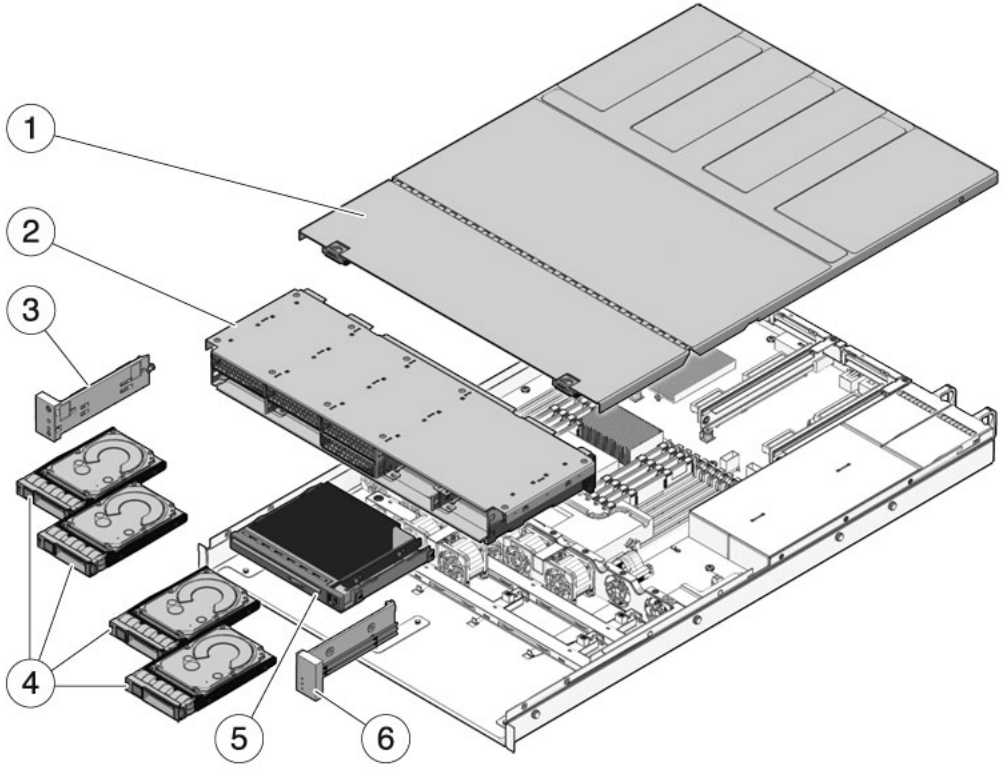


TABLE A-1 I/O Components (Sun SPARC Enterprise T5120 Server)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Top cover	Section 3.9, "Removing the Top Cover" on page 3-12 Section 7.1, "Installing the Top Cover" on page 7-2	Removing top cover if the system is running will result in immediate shutdown.	N/A
2	Hard drive cage and hard drive backplane	Section 6.3, "Servicing the Hard Drive Cage" on page 6-7 Section 6.4, "Servicing the Hard Drive Backplane" on page 6-11	Must be removed to service hard drive backplane and front control panel light pipes.	/SYS/SASBP
3	Left control panel light pipe assembly	Section 6.5, "Servicing the Front Control Panel Light Pipe Assemblies" on page 6-15		N/A
4	Hard drives	Section 4.2, "About the Hard Drives" on page 4-2 Section 4.5, "Hot-Plugging a Hard Drive" on page 4-7	Hard drives must be removed to service the hard drive backplane.	See Section 4.8, "Reference for Hard Drive Configuration" on page 4-21
5	DVD/USB Module	Section 6.1, "Servicing the DVD/USB Module" on page 6-2	Must be removed to service the hard drive backplane.	/SYS/DVD /SYS/USBBD
6	Right control panel light pipe assembly	Section 6.5, "Servicing the Front Control Panel Light Pipe Assemblies" on page 6-15	Light pipe bracket is not a FRU.	N/A

FIGURE A-2 Motherboard Components (Sun SPARC Enterprise T5120)

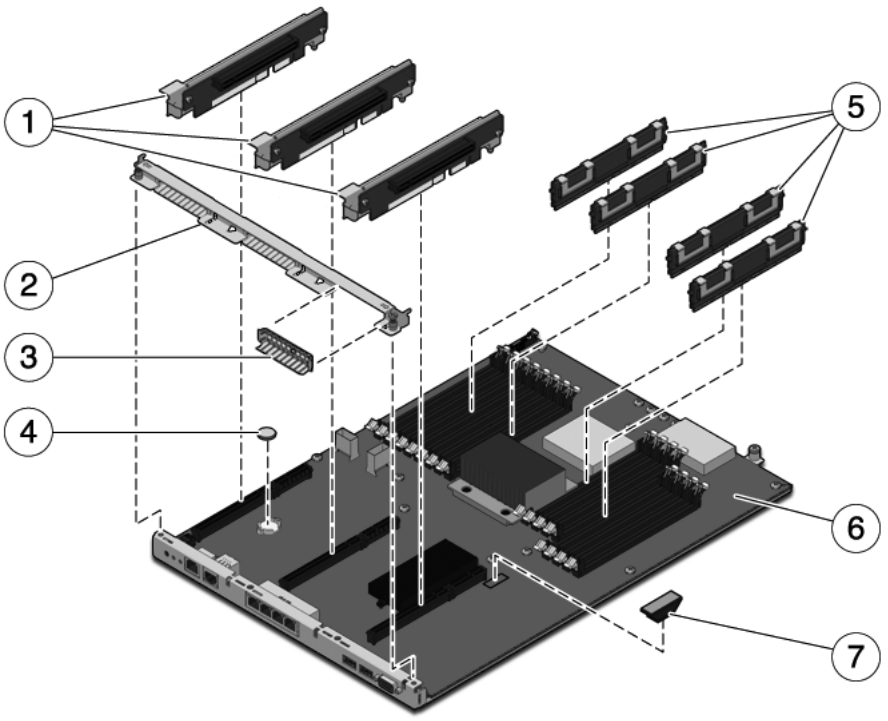


TABLE A-2 Motherboard Components (Sun SPARC Enterprise T5120 Server)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	PCIe/XAUI risers	Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13	Back panel PCI cross beam must be removed to access risers.	/SYS/MB/RISER0 /SYS/MB/RISER1 /SYS/MB/RISER2
2	Removable rear panel cross beam	Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13	Remove this to service PCIe/XAUI risers and cards.	N/A
3	PCIe filler panel	Section 5.4, "Servicing PCIe/XAUI Cards" on page 5-17	Must be installed in blank PCI slots. Spares are included with the ship kit.	N/A
4	Battery	Section 5.5, "Servicing the Battery" on page 5-22	Necessary for system clock and other functions.	/SYS/MB/BAT
5	FB-DIMMs	Section 5.1, "Servicing FB-DIMMs" on page 5-2 Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30	See configuration rules before upgrading FB-DIMMs.	See Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30
6	Motherboard assembly	Section 5.7, "Servicing the Motherboard Assembly" on page 5-26	Must be removed to access power distribution board and paddle card.	/SYS/MB
7	SCC module	Section 5.6, "Servicing the SCC Module" on page 5-24	Contains host ID, OpenBoot configuration variables, and service processor configuration data.	/SYS/MB/SC/SCC_NVRAM

FIGURE A-3 Power Distribution/Fan Module Components (Sun SPARC Enterprise T5120 Server)

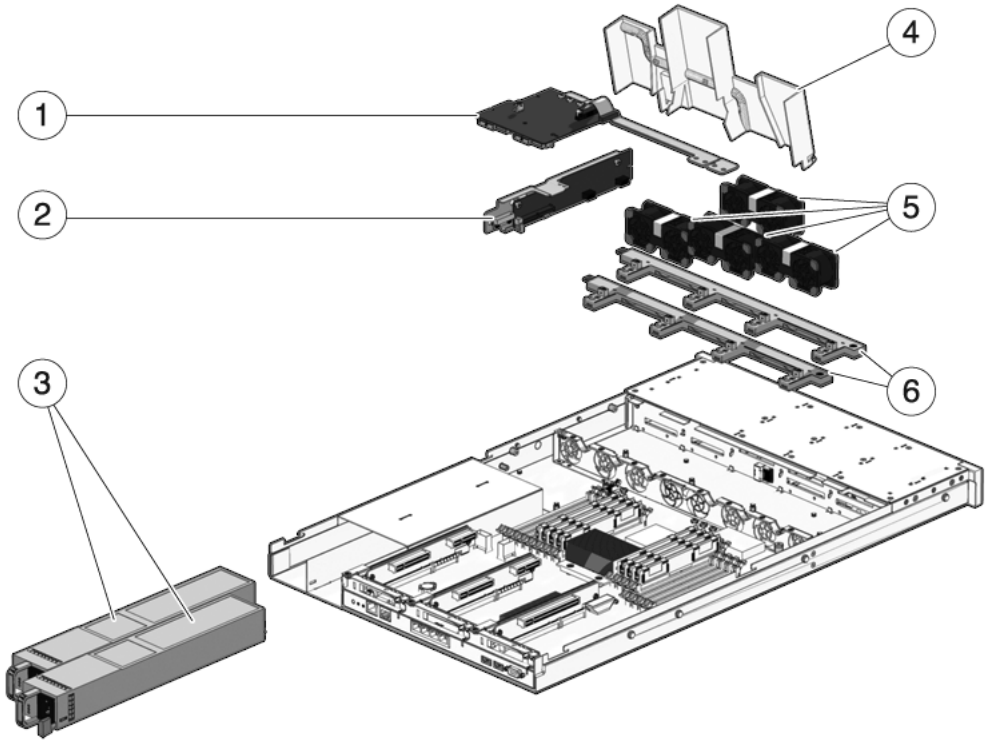


TABLE A-3 Power Distribution/Fan Module Components (Sun SPARC Enterprise T5120 Server)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Power distribution board/bus bar	Section 6.6, "Servicing the Power Distribution Board" on page 6-16	Bus bar is attached to the PDB with four screws. If replacing a defective PDB, you must move the bus bar to the new board and program the chassis serial number using the `setscn` command.	/SYS/PDB
2	Paddle card	Section 6.8, "Servicing the Paddle Card" on page 6-26	Includes the top cover interlock switch.	/SYS/CONNBD
3	Power supplies	Section 4.4, "About the Power Supplies" on page 4-5 Section 4.7, "Hot-Swapping a Power Supply" on page 4-16	Two power supplies provide N+1 redundancy	/SYS/PS0 /SYS/PS1
4	Air baffle	Section 5.2, "Servicing the Air Baffle" on page 5-11	Must be installed to provide proper cooling to the system.	N/A
5	Fan modules	Section 4.3, "About the Fan Modules" on page 4-4 Section 4.6, "Hot-Swapping a Fan Module" on page 4-13	Four fan modules must be installed in the server.	/SYS/FANBD0/FM0 /SYS/FANBD0/FM1 /SYS/FANBD0/FM2 /SYS/FANBD1/FM1
6	Fan power boards	Section 6.2, "Servicing the Fan Power Boards" on page 6-4	Must be removed to service the paddle card.	/SYS/FANBD0 /SYS/FANBD1

FIGURE A-4 Cables (Sun SPARC Enterprise T5120 Server)

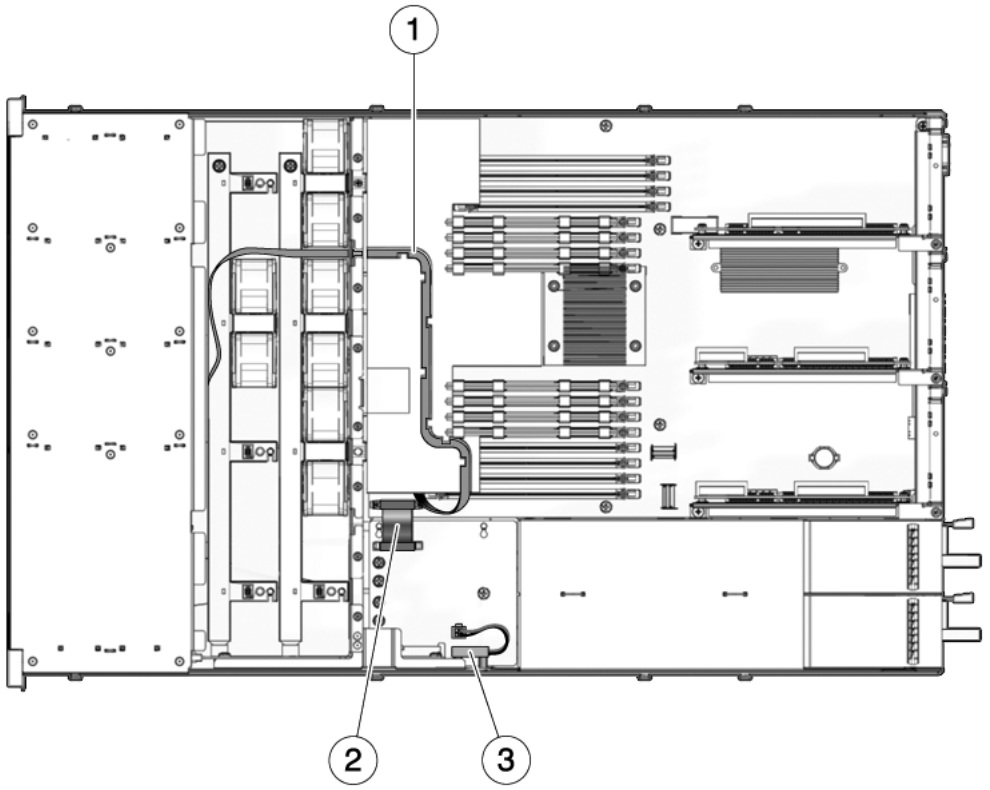


TABLE A-4 Cables (Sun SPARC Enterprise T5120 Server)

Item	FRU	Connections	Routing notes
1	SAS data cable	From J6401 on the motherboard to J0301 (P1) on the hard drive backplane.	Routed to the right of the air baffle and above the fan modules. P1 cable end attaches to hard drive backplane. P2 cable end attaches to motherboard.
2	Motherboard to PDB ribbon	From J0401 on the PDB to J5201 on the motherboard	
3	Top cover interlock	To J0205 on the PDB	

A.2 Sun SPARC Enterprise T5220 Server

FIGURE A-5 I/O Components (Sun SPARC Enterprise T5220 Server)

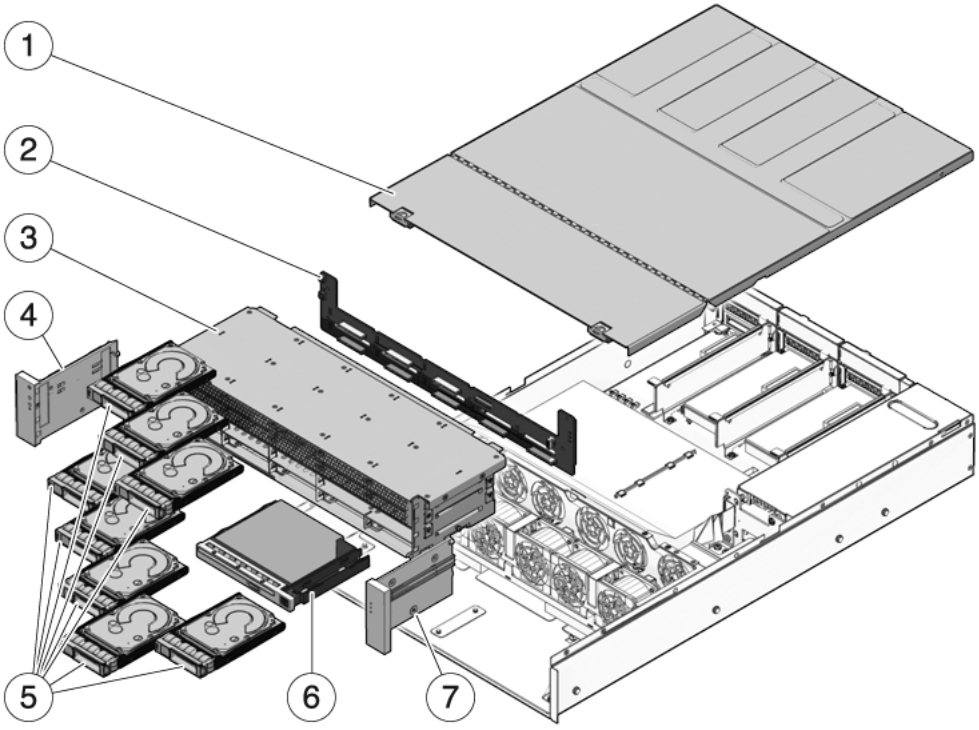


TABLE A-5 I/O Components (Sun SPARC Enterprise T5220 Server)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Top cover	Section 3.9, "Removing the Top Cover" on page 3-12 Section 7.1, "Installing the Top Cover" on page 7-2	Removing top cover if the system is running will result in immediate shutdown.	N/A
2	Hard drive backplane	Section 6.4, "Servicing the Hard Drive Backplane" on page 6-11		/SYS/SASBP
3	Hard drive cage	Section 6.3, "Servicing the Hard Drive Cage" on page 6-7	Must be removed to service hard drive backplane and front control panel light pipes.	N/A
4	Left control panel light pipe assembly	Section 6.5, "Servicing the Front Control Panel Light Pipe Assemblies" on page 6-15	Metal light pipe bracket is not a FRU	N/A
5	Hard drives	Section 4.2, "About the Hard Drives" on page 4-2 Section 4.5, "Hot-Plugging a Hard Drive" on page 4-7	Hard drives must be removed to service the hard drive backplane.	See Section 4.8, "Reference for Hard Drive Configuration" on page 4-21
6	DVD/USB Module	Section 6.1, "Servicing the DVD/USB Module" on page 6-2	Must be removed to service the hard drive backplane.	/SYS/DVD /SYS/USBBD
7	Right control panel light pipe assembly	Section 6.5, "Servicing the Front Control Panel Light Pipe Assemblies" on page 6-15	Metal light pipe bracket is not a FRU.	N/A

FIGURE A-6 Motherboard Components (Sun SPARC Enterprise T5220)

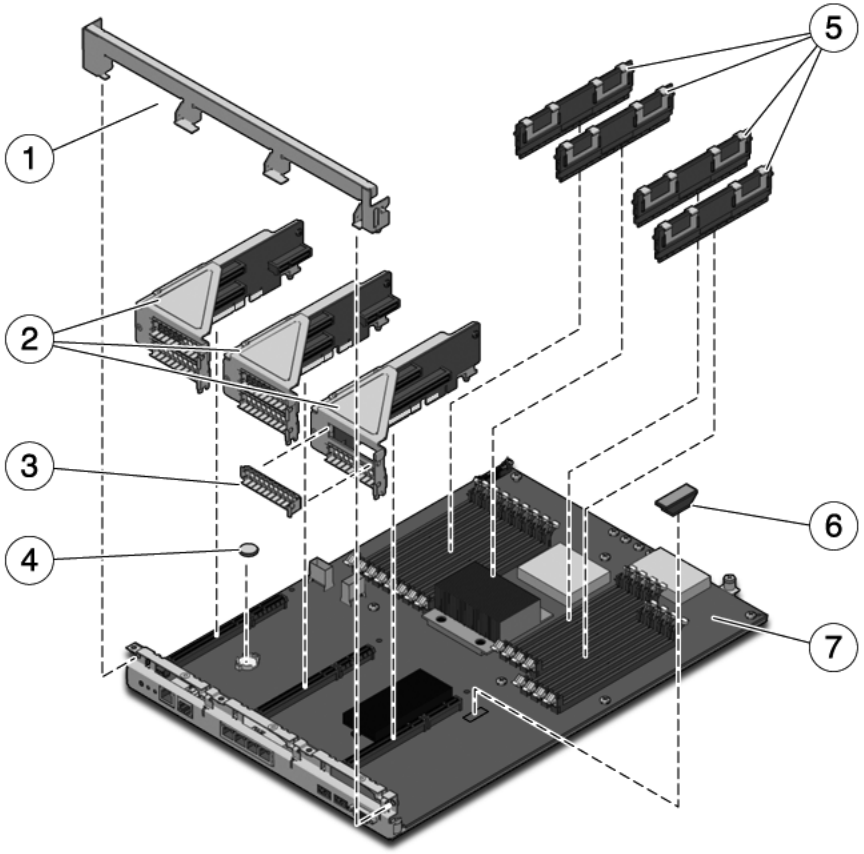


TABLE A-6 Motherboard Components (Sun SPARC Enterprise T5120 Server)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Removable rear panel cross beam	Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13	Remove this to service PCIe/XAUI risers and cards.	N/A
2	PCIe/XAUI risers	Section 5.3, "Servicing PCIe/XAUI Risers" on page 5-13	Back panel PCI cross beam must be removed to access risers.	/SYS/MB/RISER0 /SYS/MB/RISER1 /SYS/MB/RISER2
3	PCIe filler panel	Section 5.4, "Servicing PCIe/XAUI Cards" on page 5-17	Must be installed in blank PCI slots. Spares are included with the ship kit.	N/A
4	Battery	Section 5.5, "Servicing the Battery" on page 5-22	Necessary for system clock and other functions.	/SYS/MB/BAT
5	FB-DIMMs	Section 5.1, "Servicing FB-DIMMs" on page 5-2 Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30	See configuration rules before upgrading FB-DIMMs.	See Section 5.8, "Reference for FB-DIMM Configuration" on page 5-30
6	SCC module	Section 5.6, "Servicing the SCC Module" on page 5-24	Contains host ID, OpenBoot configuration variables, and service processor configuration data.	/SYS/MB/SC/SCC_NVRAM
7	Motherboard assembly	Section 5.7, "Servicing the Motherboard Assembly" on page 5-26	Must be removed to access power distribution board, power supply backplane, and paddle card.	/SYS/MB

FIGURE A-7 Power Distribution/Fan Module Components (Sun SPARC Enterprise T5220 Server)

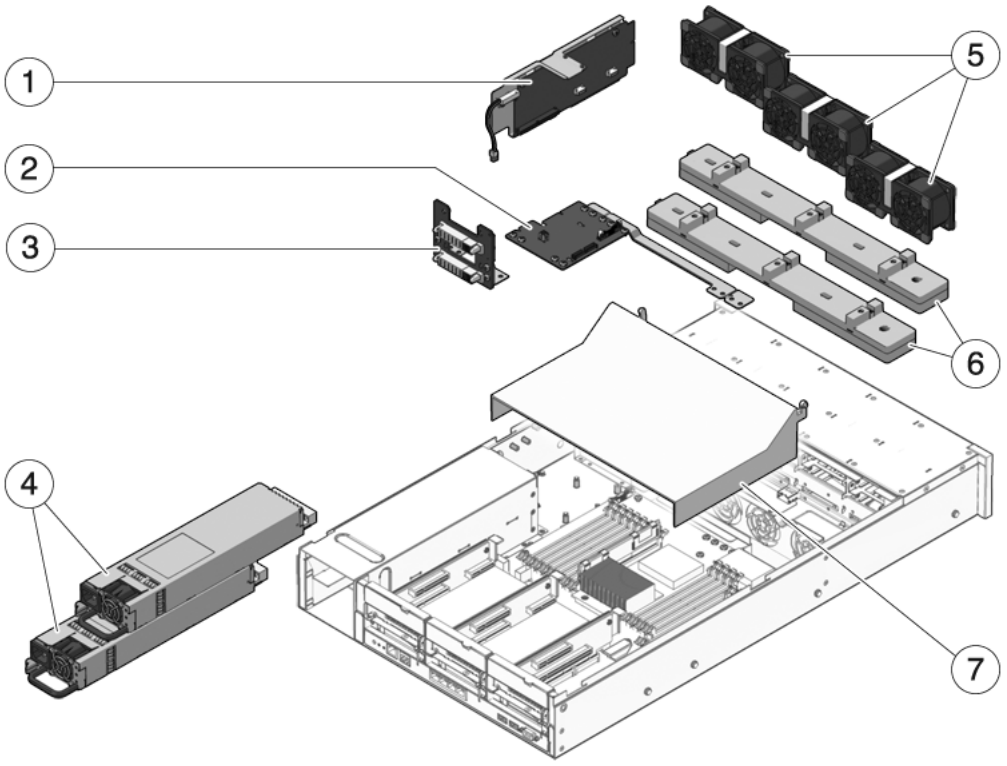


TABLE A-7 Power Distribution/Fan Module Components (Sun SPARC Enterprise T5220 Server)

Item	FRU	Replacement Instructions	Notes	FRU Name (If Applicable)
1	Paddle card	Section 6.8, "Servicing the Paddle Card" on page 6-26	Includes the top cover interlock switch.	/SYS/CONNBD
2	Power distribution board/bus bar	Section 6.6, "Servicing the Power Distribution Board" on page 6-16	Bus bar is attached to the PDB with four screws. If replacing a defective PDB, you must move the bus bar to the new board and program the chassis serial number using the `setscn` command.	/SYS/PDB
3	Power supply backplane	Section 6.7, "Servicing the Power Supply Backplane for the Sun SPARC Enterprise T5220 Server" on page 6-23	This part is bundled with the power distribution board and bus bar.	N/A
4	Power supplies	Section 4.4, "About the Power Supplies" on page 4-5 Section 4.7, "Hot-Swapping a Power Supply" on page 4-16	Two power supplies provide N+1 redundancy	/SYS/PS0 /SYS/PS1
5	Fan modules	Section 4.3, "About the Fan Modules" on page 4-4 Section 4.6, "Hot-Swapping a Fan Module" on page 4-13	Four fan modules must be installed in the server.	/SYS/FANBD0/FM0 /SYS/FANBD0/FM1 /SYS/FANBD0/FM2
6	Fan power boards	Section 6.2, "Servicing the Fan Power Boards" on page 6-4	Must be removed to service the paddle card.	/SYS/FANBD0 /SYS/FANBD1
7	Air baffle	Section 5.2, "Servicing the Air Baffle" on page 5-11	Must be installed to provide proper cooling to the system.	N/A

FIGURE A-8 Cables (Sun SPARC Enterprise T5220 Server)

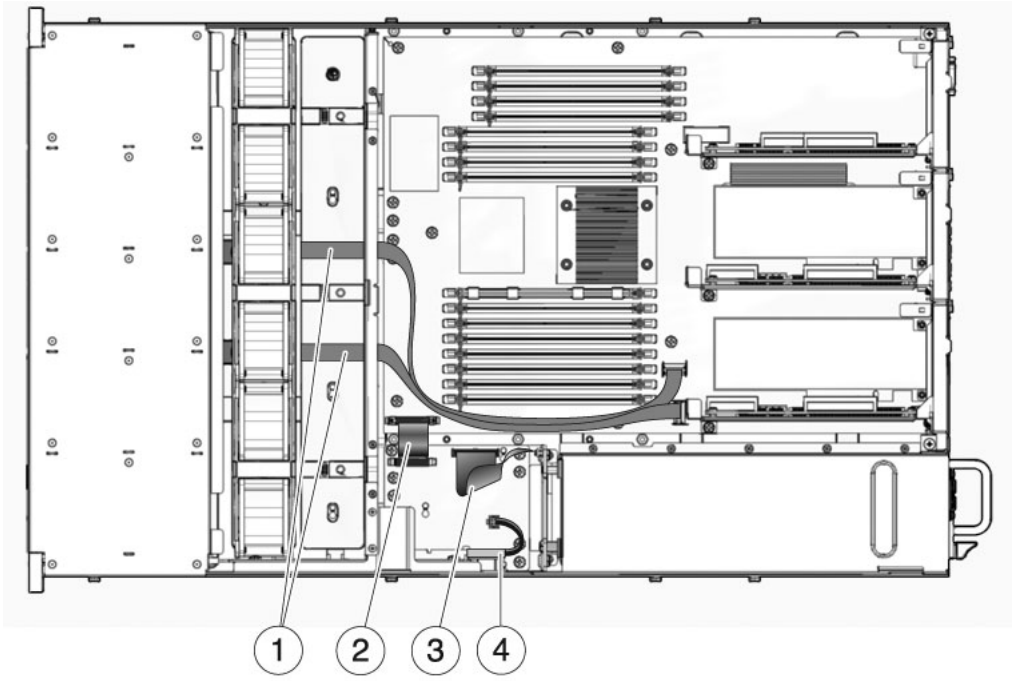


TABLE A-8 Cables (Sun SPARC Enterprise T5220 Server)

Item	FRU	Connections	Routing notes
1	SAS data cables	Cable 1: From J4601 on the motherboard to J0301 (P2) on the hard drive backplane. Cable 2: From J4602 on the motherboard to J0302 (P3) on the hard drive backplane.	Both cables are routed to the right of the air baffle, under the chassis center wall and under the fan power boards. P1 cable ends attach to hard drive backplane. P2 cable ends attach to motherboard.
2	Motherboard to PDB ribbon	From J0403 on the PDB to J5201 on the motherboard	
3	PDB to PSU backplane cable	From J0103 on the PSU backplane to J0101 on the PDB.	
4	Top cover interlock	To J0205 on the PDB	

APPENDIX **B**

Connector Pinouts

This appendix provides reference information about the system back panel ports and pin assignments.

Topics covered in this appendix include:

- Section B.1, "Reference for the Serial Management Port Connector" on page B-2
- Section B.2, "Reference for the Network Management Port Connector" on page B-3
- Section B.3, "Reference for the Serial Port Connector" on page B-4
- Section B.4, "Reference for the USB Connectors" on page B-5
- Section B.5, "Reference for the Gigabit Ethernet Connectors" on page B-6

B.1 Reference for the Serial Management Port Connector

The serial management connector (labeled SERIAL MGT) is an RJ-45 connector located on the back panel. This port is the default connection to the system console.

FIGURE B-1 Serial Management Connector Diagram

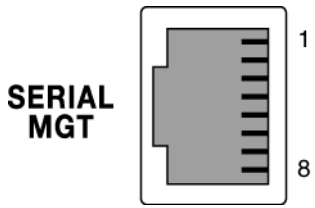


TABLE B-1 Serial Management connector signals

Pin	Signal Description	Pin	Signal Description
1	Request to Send	5	Ground
2	Data Terminal Ready	6	Receive Data
3	Transmit Data	7	Data Set Ready
4	Ground	8	Clear to Send

B.2 Reference for the Network Management Port Connector

The network management connector (labeled NET MGT) is an RJ-45 connector located on the motherboard and can be accessed from the back panel. This port needs to be configured prior to use.

FIGURE B-2 Network Management Connector Diagram

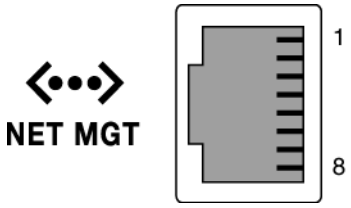


TABLE B-2 Network Management connector signals

Pin	Signal Description	Pin	Signal Description
1	Transmit Data +	5	Common Mode Termination
2	Transmit Data –	6	Receive Data –
3	Receive Data +	7	Common Mode Termination
4	Common Mode Termination	8	Common Mode Termination

B.3 Reference for the Serial Port Connector

The serial port connector (TTYA) is a DB-9 connector that can be accessed from the back panel.

FIGURE B-3 Serial Port Connector Diagram

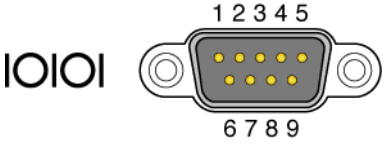


TABLE B-3 Serial port connector signals

Pin	Signal Description	Pin	Signal Description
1	Data Carrier Detect	6	Data Set Ready
2	Receive Data	7	Request to Send
3	Transmit Data	8	Clear to Send
4	Data Terminal Ready	9	Ring Indicate
5	Ground		

B.4 Reference for the USB Connectors

Two Universal Serial Bus (USB) ports are located on the motherboard in a double-stacked layout and can be accessed from the back panel.

FIGURE B-4 USB Connector Diagram

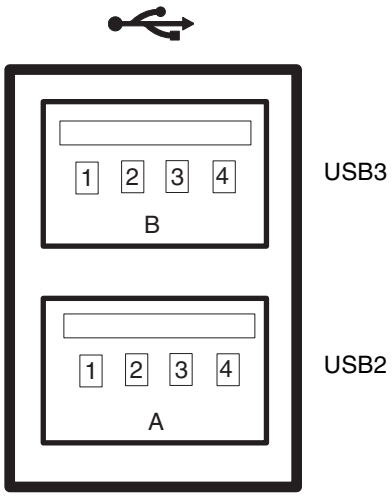


TABLE B-4 USB connector signals

Pin	Signal Description	Pin	Signal Description
A1	+5 V (fused)	B1	+5 V (fused)
A2	USB0/1-	B2	USB2/3-
A3	USB0/1+	B3	USB2/3+
A4	Ground	B4	Ground

B.5 Reference for the Gigabit Ethernet Connectors

Four RJ-45 Gigabit Ethernet connectors (NET0, NET1, NET2, NET3) are located on the system motherboard and can be accessed from the back panel. The Ethernet interfaces operate at 10 Mbit/sec, 100 Mbit/sec, and 1000 Mbit/sec.

FIGURE B-5 Gigabit Ethernet Connector Diagram

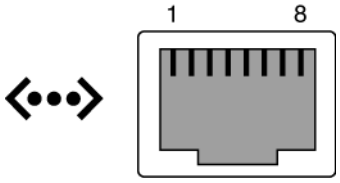


TABLE B-5 Gigabit Ethernet connector signals

Pin	Signal Description	Pin	Signal Description
1	Transmit/Receive Data 0 +	5	Transmit/Receive Data 2 –
2	Transmit/Receive Data 0 –	6	Transmit/Receive Data 1 –
3	Transmit/Receive Data 1 +	7	Transmit/Receive Data 3 +
4	Transmit/Receive Data 2 +	8	Transmit/Receive Data 3 –

Index

Numerics

3.3V standby (power supply rail), 1-9
64-bit execution pipeline, 1-3

A

AC Present (power supply LED), 2-4, 4-6, 4-20
active threads, 1-3
advanced ECC technology, 2-6
Advanced Lights Out Management (ALOM) CMT
  also see ALOM CMT compatibility shell
  and POST, 2-22
  connecting to, 2-14
  prompt, 2-14
  service related commands, 2-14
air baffle
  installing, 5-12
  removing, 5-12
airflow, blocked, 2-5
ALOM CMT compatibility shell
  about, 1-5, 2-11
  `showfaults`, 5-8
antistatic wrist strap, 3-2
architecture designation, 1-4
ASR blacklist, 2-38, 2-40
asrkeys (system components), 2-39
Automatic System Recovery (ASR), 2-38

B

battery
  FRU name, A-5, A-13
  installing, 5-23
  locating, 5-22
  removing, 5-23
blacklist, ASR, 2-38
block copy, optimized, 1-3
`bootmode` command, 2-15
`break` command, 2-15

C

cable management arm, 4-16
cables (1u)
  about, 1-9
  routing, A-8
cables (2u)
  about, 1-10
  routing, A-16
cache memory parity protection, 1-7
`cfgadm` command, 4-7, 4-8, 4-11, 4-12
chassis
  dimensions
    See site planning guide
  mounting brackets, 7-3
  serial number, 3-4
  serial number, electronic, 6-23
  thermal conditions monitored by ILOM, 1-5
chip multithreading (CMT), 1-3
`clearasrdb` command, 2-38
`clearfault` command, 2-15, 2-36, 5-8
clearing POST detected faults, 2-30
clearing PSH detected faults, 2-35
command
  `cfgadm`, 4-7, 4-8, 4-11, 4-12

clearasrdb, 2-38
clearfault, 5-8
disablecomponent, 2-40
enablecomponent, 2-38, 2-41
fmadm repair, 5-9
fmdump, 2-33
iostat -E, 4-12
poweroff, 3-5
poweron, 5-11
removefru, 2-16
set keyswitch, 5-11
setcsn, 6-16
setdate, 5-24
setlocator, 1-13, 1-17, 2-16, 3-7
setscn, A-7, A-15
showenvironment, 4-21
showfaults, 1-13, 1-17, 2-5, 2-9, 2-16, 2-17, 4-13, 5-8
showfru, 2-16, 2-20
showplatform, 3-4
components
disabled automatically by POST, 2-38
disabling using disablecomponent command, 2-40
displaying state of, 2-38
displaying using showcomponent command, 2-39
enabling using enablecomponent command, 2-41
configuration rules
FB-DIMMs, 5-30
PCIe card, 5-35
XAUI card, 5-35
connecting to ALOM CMT, 2-14
console, 2-14
console command, 2-15, 2-28, 5-7
consolehistory command, 2-15
cooling, 1-4
cores, 1-3, 1-4
CPU temperature, monitored by ILOM, 1-5
cryptography, 1-5

D

diag_level parameter, 2-23, 2-25
diag_mode parameter, 2-22, 2-25
diag_trigger parameter, 2-23, 2-25
diag_verbosity parameter, 2-23, 2-25
diagnostics
about, 2-1
flowchart, 2-3
low level, 2-22
running remotely, 2-10
using SunVTS
see SunVTS
disablecomponent command, 2-38, 2-40
displaying FRU status, 2-20
dmesg command, 2-37
DVD drive FRU name, A-3, A-11
DVD specification, 1-4
DVD/USB module
installing, 6-3
removing, 6-2

E

ejector tabs, FB-DIMM, 5-5
electrostatic discharge (ESD)
preventing, 3-11
preventing using an antistatic mat, 3-3
preventing using an antistatic wrist strap, 3-3
safety measures, 3-2
emergency shutdown, 3-5
enablecomponent command, 2-31, 2-38, 2-41
environmental faults, 2-4, 2-5, 2-11, 2-17
environmental monitoring subsystem, 1-7
error correcting code (ECC), 1-4, 1-7
error correction, 1-7
error messages, 1-7
Ethernet ports
see Gigabit Ethernet ports, network management port
event log, checking the PSH, 2-34
EVENT_ID, FRU, 2-33
exercising the system with SunVTS, 2-42

F

Fan Fault (system LED)
about, 1-14
interpreting to diagnose faults, 2-8
triggered by fan fault, 4-13
verifying state with replacement fan module, 4-15
fan module
about, 4-4

addresses, 4-23
and ILOM monitoring, 1-5
determining fault state, 2-8
Fault LED, 2-8, 4-13, 4-15
FRU name, 4-23, A-7, A-15
hot-swapping, 4-13
installing, 4-14
removing, 4-13
fan module LEDs
about, 4-4
using to identify faults, 2-8
fan power board
about, 1-9
FRU name, A-7, A-15
installing, 6-6
removing, 6-4, 6-5
fan redundancy, 1-7
fan speed, monitored by ILOM, 1-5
fan status, displaying, 2-18
Fault (fan module LED), 4-15
Fault (hard drive LED), 2-9
Fault (power supply LED), 4-5, 4-16
fault manager daemon, `fmd(1M)`, 2-32
fault records, 2-36
faults
detected by POST, 2-4, 2-17
detected by PSH, 2-4
diagnosing with LEDs, 2-7 to 2-9
environmental, 2-4, 2-5, 2-17
FB-DIMM, 5-6
forwarded to ILOM, 2-10
recovery, 2-10
repair, 2-10
types of, 2-17
FB-DIMM Fault LEDs, 2-9, 5-3
FB-DIMM fault locator button, 5-2
FB-DIMMs
configuration rules, 5-30
diagnosing with `showfaults` command, 5-6
ejector tabs, 5-5
error correcting, 1-7
example POST error output, 2-29
installing, 5-5
installing additional, 5-10
layout, 5-32
locating faulty memory modules, 5-2
managing faults in, 5-6
overview, 1-4
parity checking, 1-7
removing, 5-3
troubleshooting, 2-6
upgrading, 5-10
verifying successful replacement, 5-6
feature specifications, 1-4
firmware, 1-5
floating-point unit (FPU), 1-3
`fmadm` command, 2-36, 5-8
`fmadm repair` command, 5-9
`fmdump` command, 2-33
front panel
about (1u), 1-10
about (2u), 1-12
LED status, displaying, 2-18
front panel LEDs, 1-13
FRU event ID, 2-33
FRU ID PROMs, 2-10
FRU status, displaying, 2-20

G

Gigabit Ethernet ports
about, 1-4
LEDs, 1-18
pinouts, B-6
specifications, 1-4
graceful shutdown, 1-7, 3-4, 3-5

H

hard drive
about, 4-2
addressing, 4-10
determining fault state, 2-9
Fault LED, 2-9
FRU name, 4-21, 4-22
hot-plugging, 4-10
installing, 4-10
latch, 4-9
locations, 4-9, 4-21, 4-22
Ready to Remove LED, 4-11
release button, 4-9
removing, 4-7
specifications, 1-4
status reported by ILOM, 1-5
status, displaying, 2-18
hard drive backplane

about, 1-9
FRU name, A-3, A-11
installing, 6-13
removing, 6-11
hard drive cage
installing, 6-10
removing, 6-7
hard drive LEDs, about, 4-3
`help` command, 2-15
host ID, stored on SCC module, 1-8
hot-pluggable devices, 1-6, 4-1
hot-plugging
hard drive, 4-7, 4-10
hard drive, situations inhibiting, 4-2
hot-swappable devices, 1-6, 4-1, 4-2
hot-swapping
fan module, 4-13
power supply, 4-16

I

ILOM *see* Integrated Lights Out Management (ILOM)
important safety information, 3-2
indicators, 2-7
infrastructure boards, about, 1-8
see also power distribution board, power supply backplane, paddle card, fan power board, hard drive backplane, DVD/USB module, PCIe/XAUI riser
installing
air baffle, 5-12
battery, 5-23
DVD/USB module, 6-3
fan module, 4-14
fan power board, 6-6
FB-DIMMs, 5-5
hard drive, 4-10
hard drive backplane, 6-13
hard drive cage, 6-10
light pipe assemblies, 6-16
motherboard, 5-28
paddle card, 6-28
PCIe card, 5-19
PCIe/XAUI riser, 5-15
power distribution board, 6-19
power supply, 4-19
power supply backplane (2u), 6-25
rear panel PCI cross beam, 5-17
SCC module, 5-24
top cover, 7-2
XAUI card, 5-19
Integrated Lights Out Management (ILOM)
about, 1-5, 1-7
and use of standby power, 1-5
`iostat -E` command, 4-12

L

L1 and L2 cache, 1-3
large page optimization, 1-3
latch
hard drive, 4-9
power supply, 4-17
slide rail, 3-7
LED
AC Present (power supply LED), 2-4, 4-6, 4-20
Fan Fault (system LED), 1-14, 2-8, 4-13, 4-15
Fault (fan module LED), 2-8, 4-13, 4-15
Fault (hard drive LED), 2-9
Fault (power supply LED), 2-8, 4-5, 4-16
FB-DIMM Fault (motherboard LEDs), 2-9, 5-3
Gigabit Ethernet port, 1-18
Locator, 1-13, 1-17
Overtemp (system LED), 1-7, 1-14, 2-8
Power OK (system LED), 2-4
Power Supply Fault (system LED), 1-14, 2-8, 4-5, 4-21
Ready to Remove (hard drive LED), 4-6, 4-8, 4-11
Ready to Remove (power supply LED), 4-6
Service Required (system LED), 1-7, 1-13, 2-8, 2-9, 4-7, 4-13
LEDs
about, 2-7
fan module, 2-8, 4-4
front panel, 1-13
hard drive, 4-3
network management port, 1-18
rear panel, 1-17
using to diagnose faults, 2-7
using to identify device state, 2-7
light pipe assemblies, front panel
installing, 6-16
removing, 6-15
Locator button, 1-10, 1-14
Locator LED, 1-13, 1-17

log files, viewing, 2-37

M

Mac addresses, stored on SCC module, 1-8
maintenance position, 3-6, 3-9
memory
  also see FB-DIMMs
  fault handling, 2-6
  overview, 1-4
memory access crossbar, 1-3
memory controllers, 1-3
message ID, 2-32
messages file, 2-37
motherboard
  about, 1-8
  FRU name, A-5, A-13
  installing, 5-28
  migrating new SCC module to, 1-8
  removing, 5-26
motherboard handles, 5-27

N

network management port
  LEDs, 1-18
  pinouts, B-3
normal rack position, returing server to, 7-4

O

Overtemp (system LED), 1-7, 1-14, 2-8
overtemperature condition, 2-8, 4-13

P

paddle card
  about, 1-9
  FRU name, A-7, A-15
  installing, 6-28
  removing, 6-27
parity checking, 1-7
parity protection, 1-7
PCIe card
  configuration rules, 5-35
  FRU name (1u), 5-35
  FRU name (2u), 5-36
  installing, 5-19
  removing, 5-18
PCIe interface, about, 1-4
PCIe/XAUI riser
  about, 1-9
  FRU name, A-5, A-13
  installing, 5-15
  removing, 5-13
performance enhancements, 1-3
pinouts
  Gigabit Ethernet ports, B-6
  network management port, B-3
  serial management port, B-2
  serial port (DB-9), B-4
  USB ports, B-5
platform name, 1-4
POST
  see power-on self-test (POST)
power cords
  plugging into server, 7-5
  unplugging before servicing the system, 3-2, 5-1, 6-1
power distribution board
  about, 1-9
  FRU name, A-7, A-15
  installing, 6-19
  removing, 6-16
Power OK (system LED), 2-4
power specifications, 1-4
power supply
  about, 4-5
  AC Present LED, 2-4, 4-6, 4-20
  Fault LED, 2-8, 4-5, 4-16
  FRU name, 4-24, A-7, A-15
  hot-swapping, 4-19
  installing, 4-19
  Ready to Remove LED, 4-6
  redundancy, about, 1-7
  removing, 4-16
  status monitored by ILOM, 1-5
  status, displaying, 2-18
power supply backplane (2u)
  about, 1-9
  installing, 6-25
  removing, 6-24
Power Supply Fault (system LED)
  about, 1-14, 4-5
  interpreting to diagnose faults, 2-8
  using to verify successful power supply replacement, 4-21

`powercycle` command, 2-15, 2-27
powering off server
  emergency shutdown, 3-5
  from service processor prompt, 3-4
  graceful shutdown, 3-5
  service processor command, 3-4
powering on
  at service processor prompt, 7-5
  using Power button, 7-5
`poweroff` command, 2-15, 3-5
`poweron` command, 2-15, 5-7, 5-11
power-on self-test (POST)
  about, 2-22
  ALOM CMT commands, 2-22
  components disabled by, 2-38
  configuration flowchart, 2-24
  controlling output, 2-22
  error messages, 2-29
  fault clearing, 2-30
  faults detected by, 2-4, 2-17
  faults reported to ILOM, 1-5
  faulty components detected by, 2-30
  parameters, changing, 2-25
  reasons to run, 2-26
  running in maximum mode, 2-26
  troubleshooting with, 2-5
  using for fault diagnosis, 2-4
Predictive Self-Healing (PSH)
  about, 1-8, 2-32
  clearing faults, 2-35
  diagnostic facilities accessed by ILOM, 1-5
  faults detected by, 2-4
  faults displayed by ILOM, 2-17
  finding faults detected by, 2-5
  memory faults, 2-6
processor, 1-3
processor designation, 1-4
PSH
  see Predictive Self-Healing (PSH)

Q

quick visual notification, 2-1

R

rack
  extending server to maintenence position, 3-6
  installing server into, 7-3
  removing server from, 3-8
  returning server to normal position, 7-4
  slide rails, 7-3
RAID (redundant array of independent disks)
  storage configurations, 1-7
Ready to Remove (hard drive LED), 4-6, 4-8, 4-11
Ready to Remove (power supply LED), 4-6
rear panel access (1u), 1-14
rear panel access (2u), 1-16
rear panel LEDs, 1-17
rear panel PCI cross beam
  installing, 5-17
  removing, 5-14
rear panel PCI cross beam, removing, 5-13
reinstalling server in rack, 7-3
reliability, availability, serviceability (RAS)
  features, 1-6
remote management, 1-5
`removefru` command, 2-16
removing
  air baffle, 5-12
  battery, 5-23
  DVD/USB module, 6-2
  fan module, 4-13
  fan power board, 6-4, 6-5
  FB-DIMMs, 5-3
  hard drive, 4-7
  hard drive backplane, 6-11
  hard drive cage, 6-7
  light pipe assemblies, 6-15
  motherboard, 5-26
  paddle card, 6-27
  PCIe card, 5-18
  PCIe/XAUI riser, 5-13
  power distribution board, 6-16
  power supply, 4-16
  power supply backplane (2u), 6-24
  rear panel PCI cross beam, 5-13, 5-14
  SCC module, 5-24
  server from rack, 3-8
  top cover, 3-12
  XAUI card, 5-18
`reset` command, 2-16
`resetsc` command, 2-16

S

safety information, 3-1

safety symbols, 3-2
sanity check for hardware components, 2-26
sc_servicemode parameter, 6-23
SCC module
  and host ID, 1-8
  and Mac addresses, 1-8
  FRU name, A-5, A-13
  installing, 5-24
  migrating to new motherboard, 1-8
  removing, 5-24
sensors, temperature, 1-7
serial management port
  pinouts, B-2
serial number, chassis, 3-4
  obtaining using the showplatform command, 3-4
serial port (DB-9)
  pinouts, B-4
service processor
  see Integrated Lights Out Management (ILOM)
service processor prompt, 3-5
Service Required (system LED)
  about, 1-13
  cleared by enablecomponent command, 2-31
  interpreting to diagnose faults, 2-8, 2-9
  triggered by fan fault, 4-13
  triggered by ILOM, 2-10
  triggered by power supply fault, 4-7
  triggered by temperature event, 1-7
set keyswitch command, 5-11
setcsn command, 6-16, 6-22
setdate command, 5-24
setkeyswitch parameter, 2-16, 2-25, 5-7
setlocator command, 1-13, 1-17, 2-16, 3-7
setscn command, A-7, A-15
showcomponent command, 2-38, 2-39
showenvironment command, 2-16, 2-18
showfaults command
  and Service Required LED, 1-13, 1-17, 2-9
  description and examples, 2-17
  syntax, 2-16
  troubleshooting with, 2-5
  using to check for faults, 2-4
  using to diagnose FB-DIMMs, 5-6
  using to identify fan module faults, 4-13
  using to verify successful FB-DIMM replacement, 5-8
showfru command, 2-16, 2-20
showkeyswitch command, 2-16
showlocator command, 2-16
showlogs command, 2-16
showplatform command, 2-16, 3-4, 6-23
shutdown, triggered by temperature event, 1-7
slide rail latch, 3-7
Solaris log files, 2-4
Solaris OS
  checking log files for fault information, 2-4
  collecting diagnostic information from, 2-37
  message buffer, checking, 2-37
  message log files, viewing, 2-37
Solaris Predictive Self-Healing (PSH)
  see Predictive Self-Healing (PSH)
standby, 1-5
standby power
  and ILOM, 1-5
sun4v architecture, 1-3
SunVTS
  about, 2-2
  as fault diagnosis tool, 2-4
  exercising the system with, 2-42
  running, 2-43
  tests, 2-46
  user interfaces, 2-43, 2-44, 2-46, 2-47
  using for fault diagnosis, 2-4
support, obtaining, 2-5
syslogd daemon, 2-37
system components
  see components
system console, switching to, 2-14
system controller, 2-2
system temperatures, displaying, 2-18

T

temperature sensors, 1-7
terminal server, 1-5
thermal conditions monitored by ILOM, 1-5
TLB misses, reduction of, 1-3
tools required for service, 3-3
top cover
  installing, 7-2
  removing, 3-12

top cover interlock cable, 1-9, 1-10
troubleshooting
  AC OK LED state, 2-4
  actions, 2-4
  by checking Solaris OS log files, 2-4
  FB-DIMMs, 2-6
  Power OK LED state, 2-4
  using LEDs, 2-7
  using POST, 2-4, 2-5
  using Predictive Self-Healing (PSH) software, *see* Predictive Self-Healing (PSH)
  using SunVTS, 2-4
  using the `showfaults` command, 2-4
`TTYA` *see* serial port (DB-9)

U

UltraSPARC T2 multicore processor, 1-3, 2-32
Universal Unique Identifier (UUID), 2-32, 2-34
upgrading FB-DIMMs, 5-10
USB ports
  about, 1-4
  also see DVD/USB module
  pinouts, B-5
USB ports (front), 1-10
  FRU name, A-3, A-11

V

virtual keyswitch, 2-25, 5-7
voltage and current sensor status, displaying, 2-18
voltage levels, monitored by ILOM, 1-5

X

XAUI card
  about, 1-9
  about10 Gbit Ethernet card
    see XAUI card
  configuration rules, 5-35
  FRU name (1u), 5-35
  FRU name (2u), 5-36
  installing, 5-19
  removing, 5-18